



## IFC-MBOX2800

### Fanless Embedded Box PC

- Intel® Atom™ processor
- Intel CG82NM10 PCH
- Onboard 2GB DDR3 memory
- Intel® integrated graphic media accelerator 3600
- VGA/HDMI Display
- 1 x Intel®82583 GbE LAN
- 1 x RS232, 6 x USB
- 12V~24V Wide range voltage input



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## Product Warranty (1 years)

IFC warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for one years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by IFC, or which have been subject to misuse, abuse, accident or improper installation. IFC assumes no liability under the terms of this warranty as a consequence of such events.

Because of IFC's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an IFC product is defective, it will be repaired or replaced at no charge during the warranty period. For out of warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, IFC products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

## Declaration of Conformity

### FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC part15, CE E50252E, GB9254 Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Technical Support and Assistance

1. Visit the IFC web site at [www.ifc-ipc.cn](http://www.ifc-ipc.cn) where you can find the latest information about the product.
2. Contact your distributor, sales representative, or IFC's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
  - Product name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

## Warnings, Cautions and Notes



### **Warning!**

*Warnings indicate conditions, which if not observed, can cause personal injury!*



### **Caution!**

*Cautions are included to help you avoid damaging hardware or losing data.*



**Note!** *Notes provide optional additional information.*



## Safety Instructions

1. Read these safety instructions carefully. Keep this User Manual for later reference.
2. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. Do not cover the openings.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment does not work well, or you cannot get it to work according to the user's manual.
  - The equipment has been dropped and damaged.
  - The equipment has obvious signs of breakage.
15. Do not leave this equipment in an environment where the storage temperature may go below -20° c (-4° f) or above 60° c (140° f). This could damage the equipment. The equipment should be in a controlled environment.
16. Caution: danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer, discard used batteries according to the manufacturer's instructions.
17. Caution: Any unverified component could cause unexpected damage. To ensure the correct installation, please always use the components (ex. Screws) provided with the accessory box.
18. Caution: The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacture. Discard used batteries according to the manufacturer's instructions.

19. Caution: Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

Disclaimer: This set of instructions is given according to IEC 704-1. IFC disclaims all responsibility for the accuracy of any statements contained herein.

## Packing list

Before installation, please ensure the following items have been shipped:

1 x IFC-MBOX2800 unit

AC-DC adapter, DC12V / 5A 60W, 0 ~ 45 ° C, suitable for home and office use VESA mounting kit

## Ordering Information

Model Number	Description
IFC-MBOX2800-N8 USB+1 RS232	Intel® Atom™ N2800 1.86GHz w/VGA+HDMI+LAN+6
IFC-MBOX2800-N6 USB+1 RS232	Intel® Atom™ N2600 1.66GHz w/VGA+HDMI+LAN+6

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# Chapter 1

## General Introduction

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**This chapter gives background information on IFC-MBOX2800 series.**

## 1.1 Introduction

The IFC-MBOX2800 fanless Embedded Box Computer is an ideal, application-ready system platform solution. All electronics are protected in a compact, sealed, aluminum case for easy embedding in the customer's own housing, or as a stand-alone application where space is limited and the environment harsh.

The solid, sealed aluminum case offers vibration and dust resistance while also providing a passive cooling solution. The IFC-MBOX2800 provides system integrators with a turnkey solution and versatile application development path without breaking the bank or missing time-to-market deadlines.

IFC-MBOX2800 is designed as a palm-size fanless embedded system and occupies only 146 x 136 x 32 mm. The rugged, cast aluminum case not only provides great protection from EMI, shock/vibration, cold and heat, but also passive cooling for quiet, fanless operation. IFC-MBOX2800 meets demands by offering up to 1 x VGA, 1x HDMI, 1 x Giga LAN, 6 x USB 2.0 ports, and 1 x COM ports all packed into a compact rugged unit and powered by an Intel® Atom™ N2600/ N2800 processor. IFC-MBOX2800 also supports both 2.5" SATA HDD and SATA SSD for storage. Besides, IFC-MBOX2800 is a low-power-consumption system and it is powered by DC 12-24V input. The IFC-MBOX2800 provides for diversified application fields.

## 1.2 Features

### Key features

- Extremely compact, sealed construction with fanless operation, supports Intel®
- Atom™ N2600 1.6 GHz / N2800 1.86 GHz CPU
- Ultra slim palm-size system with 2.5" SATA HDD/SATA SSD support
- Low power consumption system
- Support VESA/desk mountings

## 1.3 Specifications

### 1.3.1 General

**CPU:** Intel® Atom™ Dual Core Processor N2600 1.6 GHz/N2800 1.86 GHz

**System Chipset:** Intel® NM10 Express Chipset

**BIOS:** AMI 16 Mbit Flash BIOS

**System Memory:** On board 2GByte DD3 1066MHz SDRAM

**Watchdog Timer:** 255-level interval timer, setup by software

**Serial Ports:** 1 RS232 port (ESD protection: air gap ±15 kV, contact ±8 kV)

**USB:** 6 x USB 2.0 compliant Ports

**Audio:** High Definition Audio Codec - Realtek ALC662, with Line-in, Line-out

**Expansion Interface:** Support up to 1 x full size Mini-PCle

**Storage:** SATA: Support 1 x 2.5" SATAII SSD/HDD

### 1.3.2 Integrated Graphics Controller

- Contains Intel graphics processing GMA3600 core
- Directx 10.1 compliant Pixel Shader\* V3.0 and OGL 3.0
- 400 MHz( N2600/N2650) graphic core frequency
  - Video RAM shared with system memory
  - Display ports: VGA output
- VGA: analog RGB display output up to resolution 1920 x 1200 @ 60Hz for N2000 serial
- The Intel® Atom™ Processor N2000 series supports full MPEG2 (VLD/ iDCT/MC), WMV, Fast video Composing, HW decode/ acceleration for MPEG4 Part 10 (AVC/H.264) & VC-1; 720p60, 1080i60, 1080p@24 up to 20 Mps
- MPEG4 part2 does not utilize Next Generation Intel® Atom™ Processor based (Desktop and Mobile) Platform H/W
- Hardware Decode assist for Flash Decode for Adobe 11.0 and newer versions

### 1.3.3 Ethernet

**Chipset:** Intel® 82583V

**Speed:** 10/100/1000 Mbps, support Wake on LAN

**Interface:** Up to 1 x RJ45

**Standard:** Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 8023y, IEEE 802.ab.

### 1.3.4 Electrical Specifications

- Power supply type: AT / ATX jumper select
- Power management: ACPI 3.0, APM
- Power requirement: +12V-24V DC Wide range voltage input. Support power input reverse direction protection, recoverable fuse.
- **Power Adapter:** AC to DC 12 V/5A, 60W

- Power consumption:

Voltage		D2600(Fanless)	
		Current	Power
Idle mode	+12V	0.74	8.88

Power on	+12V	1.09	13.08
Max load	+12V	0.88	10.56

- Power consumption test conditions:
  - Test conditions: Windows®XP Professional, Burn test ver5.3, 320G SATA HDD
  - Idle mode: Measure the current value when system is on windows mode and without running any program
  - Power on - Boot: Measure the maximum current value between system power on and boot-up to OS
  - Max load: Measure the maximum current value when system is under maximum load (CPU with top speed, RAM & Graphic with full loading)
- RTC battery: Lithium 3 .3V/210mAH CR2032 battery

## 1.4 OS Support

It supports Win7, Win XP(Not support 3D and Media Hardware Decode), Win CE 6.0, and Linux Ubuntu 10.04 UP

## 1.5 OTHER

- Deep sleep S4 mode
- Reset/Power bottom/Power LED/HDD LED/Com state LED
- Watchdog Timer: Output system reset, programmable counter from 1-255 min/sec
- Security data area: 64 bytes on EEPROM for customer saving sensitive data

## 1.6 Environmental Specifications

### Operating temperature:

- 20 ~ 60° C (With extended temperature SSD devices)
- 0 ~ 45° C (With standard temperature HDD/SSD devices)

**Relative humidity:** 95% @ 40°C (non-condensing)

**Storage temperature:** -40 ~ 85°C (-40 ~ 185°F)

### Vibration loading during operation:

- With SSD: 3 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis

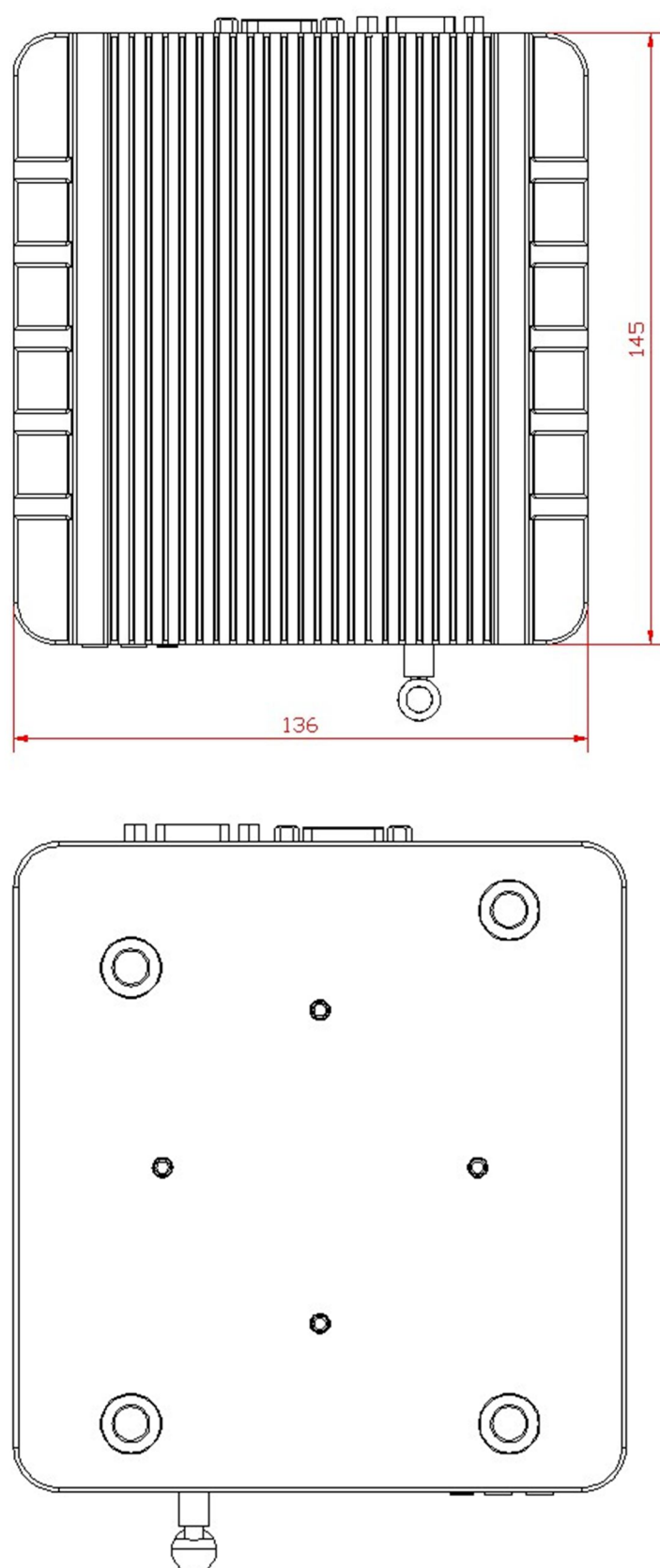
### Shock during operation:

- With SSD: 30 G, IEC 60068-2-64, half sine, 11 ms duration

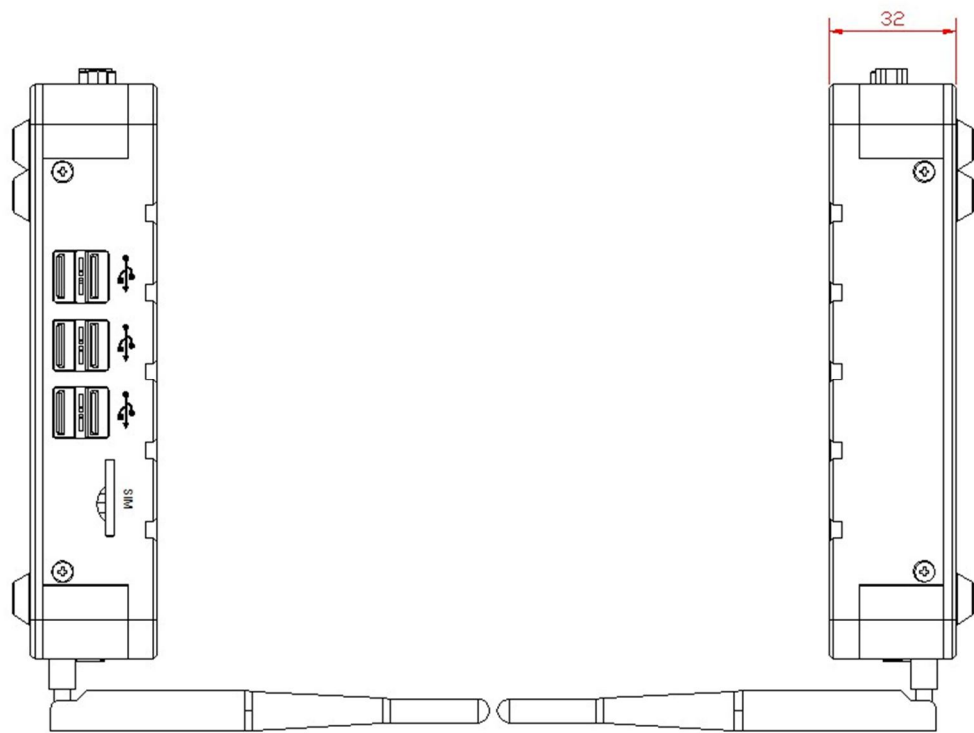
**Safety:** UL,CB,CCC

**EMC:** CE, FCC Class A, GB9254

## 1.7 Mechanical Specifications







**Figure 1.7 IFC-MBOX2800 mechanical dimension drawing**

# Chapter 2

## H/W Installation

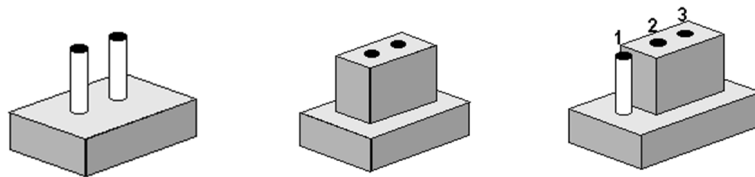
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**This chapter explains the setup procedures of the IFC-MBOX2800 hardware, including instructions on setting jumpers and connecting peripherals, switches and indicators. Be sure to read all safety precautions before you begin the installation procedure.**

## 2.1 Jumpers

### 2.1.1 Jumper Description

Cards can be configured by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, you connect the pins with the clip. To open a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



The jumper settings are schematically depicted in this manual as follows.



A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

Generally, you simply need a standard cable to make most connections.

**Warning!** To avoid damaging the computer, always turn off the power supply before setting jumpers.



How to verify Pin1 of the jumper?


1. Please check the M/B carefully, where there is a mark of "1" or white thick line, there is Pin1.
2. Look into the pad on the back side of the M/B, generally the square side of the pad is Pin1.

## 2.1.2 Jumper Setting

### **JVCC1**      LVDS LCD Working Voltage Select

Part Number \_\_\_\_\_

Description      Pin Header 1x3Pin 2.54mm DIP & Jumper 2.54mm


Setting	Function	
1-2 On (Default)	+3.3V	
2-3 On	+5V	

The operating voltage of LCD in the market are generally 3.3V and 5V, so please read the LCD Datasheet carefully before setting right operating voltage, otherwise the LCD panel may be burned or not work normally. Any damage result from this is NOT covered in free warranty range.

### **AT ON1**      AT & ATX Power Mode Select

Part Number \_\_\_\_\_

Description      Pin Header 1x3Pin 2.54mm DIP & Jumper 2.54mm


Setting	Function	
1-2 On (Default)	AT	
2-3 On	ATX	

Select AT or ATX model

### **JCMOS**      CMOS Clear/AT & ATX Power Mode Select

Part Number \_\_\_\_\_

Description      Pin Header 1x3Pin 2.54mm DIP & Jumper 2.54mm

Setting	Function	
1-2 On (Default)	Normal	
2-3 On	Clear BIOS	

---

**How to clear CMOS: (Must follow steps as below)**

If any of these states happens: such as CMOS data corruption, administrator or password of the BIOS forgotten, not able to boot-up due to wrong setting of the CPU frequency in BIOS, or the CPU/Memory need to clear the CMOS setting, then you can use this jumper to clear CMOS, and BIOS will reset to default settings.

- Pin1 and Pin2 short circuit (default): Normal Condition;
- Pin2 and Pin3 short circuit: Clear CMOS setting;

Clear CMOS setting and load default settings:

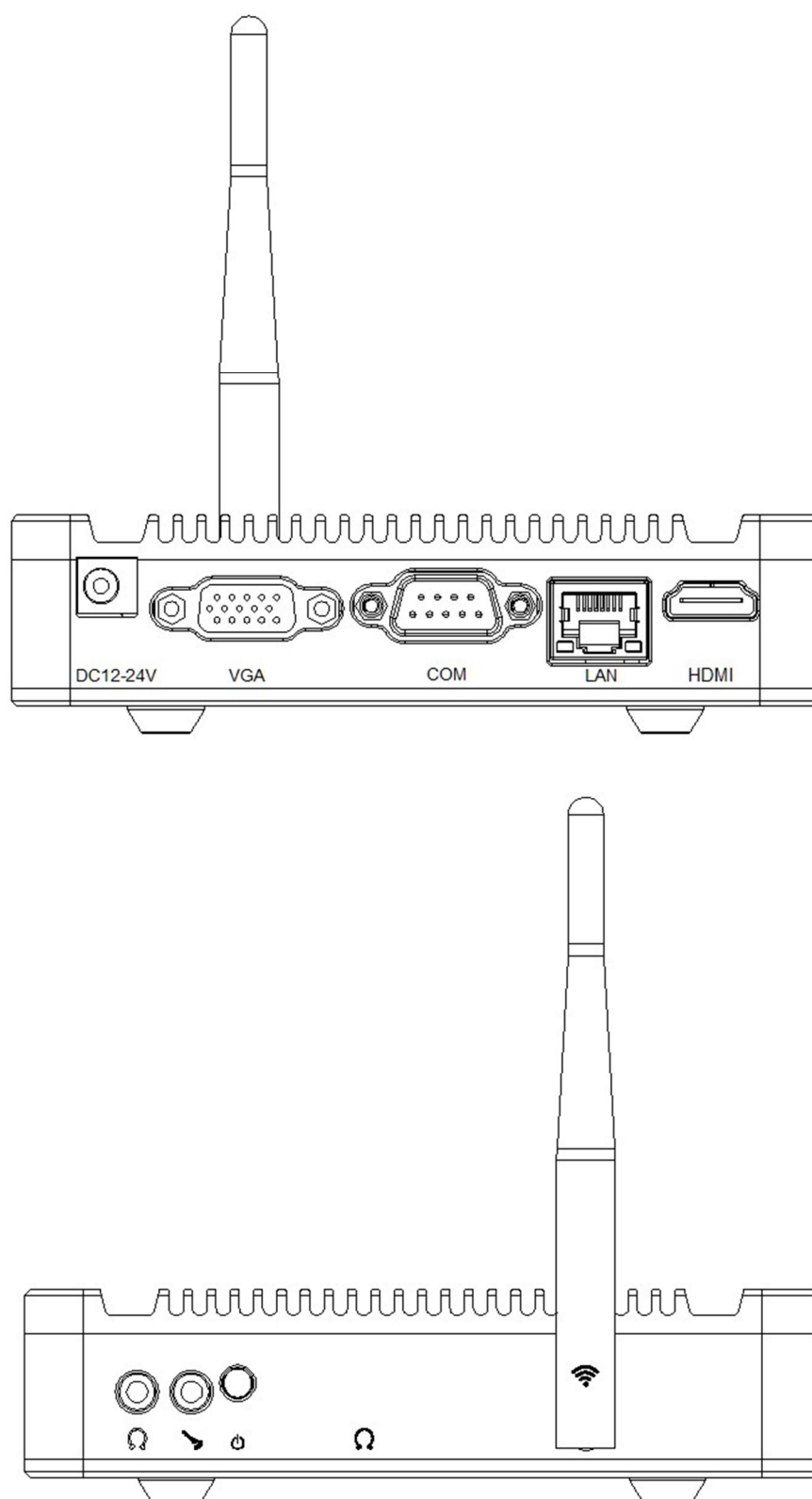
1. Turn-off the system power;
2. Use jumper to make Pin2 and Pin3 short circuit, waiting for 3-5sec., then reset the jumper as Pin1 and Pin2 short circuit.
3. Turn-on the system power
4. If it is the wrong setting of CPU frequency in BIOS, then please press F2 to enter BIOS setting menu once the system reboot.
5. Set the CPU operating speed to default value or a reasonable value;
6. Save & Exit the BIOS menu.

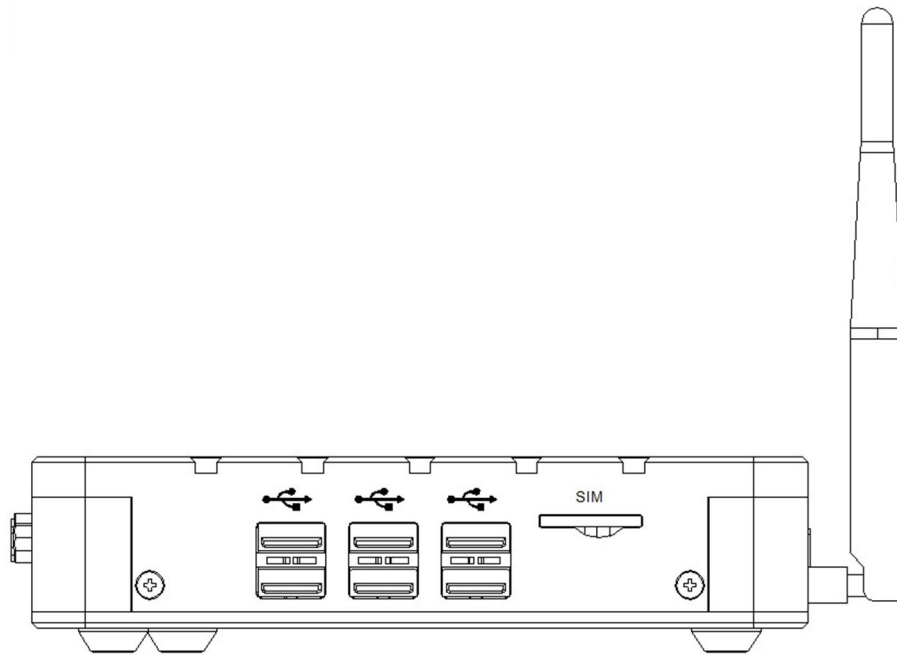
**Power Mode Select:**

**AT power mode: Boot-up automatically when power-on.**

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### 2.1.3 IFC-MBOX2800 I/O Indication





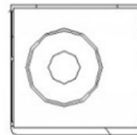
**Figure 1.7 IFC-MBOX2800 mechanical dimension drawing**

## 2.2 External I/O Connectors & Pin Assignments

### **Power Input Connector (DC IN1)**

Part Number

Description DC-Jack HXSDC-S-R-01-120U"-10.0\*9.1-J-B-C-Sn 5Pin DIP



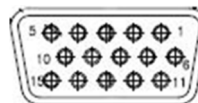
Pin	Signal	Pin	Signal
1	GND	2	DC

IFC-MBOX2800 comes with a DC-Jack header that carries 12-24VDC external power input. The bracket makes the power connector very secure.

### **VGA** VGA Port with Back I/O Panel

Part Number

Description VGA Port D-Sub 15Pin Female DIP



Pin	Signal	Pin	Signal
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND
11	NC	12	DATA
13	HSYNC	14	VSYNC
15	DCLK		

VGA: analog RGB display output up to resolution 1920 x 1200 @ 60Hz

### **COM** DB9 COM Port with Back I/O Panel

Part Number

Description COM Port D-Sub 9Pin Male DIP



Pin	Signal	Pin	Signal
1	NNDCCD1#	2	NRX1
3	NTX1	4	NDTR1#

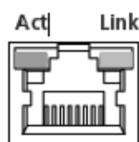


5	GND	6	NDSR1#
7	NRTS1#	8	NCTS1#
9	NNRI1#		
1. Max. traffic rate: 115200bps			

## LAN RJ45 Port with Back I/O panel

Part Number

Description RJ45 Port with Active/link state LED



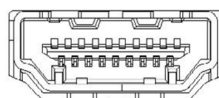
Pin	Signal	Pin	Signal
1	GND	2	LAN1_MDI0P
3	LAN1_MDI0N	4	LAN1_MDI1P
5	LAN1_MDI1N	6	LAN1_MDI2P
7	LAN1_MDI2N	8	LAN1_MDI3P
9	LAN1_MDI3N	10	CHASSIS
11	+3.3V_LAN1	12	LAN1_LINK#
13	LAN1_ACT#	14	+3.3V_LAN1
15	CHASSIS	16	CHASSIS
17	NC	18	NC
19	LAN1TCT(LAN21V9)	20	LAN1TCTG

IFC-MBOX2800 provides one RJ45 LAN interface connector which is fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. It is equipped with 82583V and support Wake on LAN. The Ethernet port uses a standard RJ-45 jack connector with LED indicators on the front side to show Active/Link status and Speed status Intel 82583V PCI-E 10/100/1000 Mb/s Ethernet, supporting wake on LAN and PXE.

## HDMI HDMI Port with Back I/O Panel

Part Number

Description VGA Port D-Sub 15Pin Female DIP



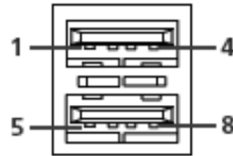
Pin	Signal	Pin	Signal
1	HDMI_DATA2_P	2	GND
3	HDMI_DATA2_N	4	HDMI_DATA1_P
5	GND	6	HDMI_DATA1_N
7	HDMI_DATA0_P	8	GND
9	HDMI_DATA0_N	10	HDMI_CLK_P
11	GND	12	HDMI_CLK_N
13	NC	14	NC
15	HDMI_CTRL_CLK	16	HDMI_CTRL_DATA
17	GND	18	HDMI_VCC5
19	HDMI_HPD_R		

VGA: analog RGB display output up to resolution 1920 x 1200 @ 60Hz

**USB1,USB2 ,USB3** USB2.0/1.1 Port with left I/O panel

Part Number \_\_\_\_\_

Description Double USB Port AF90° 12Pin DIP



Pin	Signal	Pin	Signal
1	USB1_VCC	2	USB_DATA-
3	USB_DAT+	4	GND
5	USB1_VCC	6	USB_DATA-
7	USB_DAT+	8	GND
9	CHASSIS	10	CHASSIS
11	CHASSIS	12	CHASSIS

1. Provides four USB (Universal Serial Bus) 2.0 Ports Plug and Play . The USB interface complies with high speed USB specification Rev. 2.0 which supports 480 Mbps transfer rate, and are fuse protected.
2. The USB interface can be disabled in the system BIOS setup.
3. To better meet our clients' application, +5V doesn't do limited 500mA current protection, so every USB output can satisfy max. 1A current demand.

**SIM** SIM Card Socket

Part Number \_\_\_\_\_

Description SIM Card Socket Push 7+2Pin SMD



Pin	Signal	Pin	Signal
1	SIM_PWR	2	SIM_RST#
3	SIM_CLK	4	GND
5	SIM_VPP	6	SIM_DATA

Support 3G UIM card, Pop-up holder

**AUDIO (AUDIO1)** AUDIO Connector front I/O panel

Part Number \_\_\_\_\_

Description AUDIO Jack Green Vertical 5Pin DIP



Pin	Signal	Pin	Signal
IFC-MBOX2800 offers stereo audio ports by two 3.5 ear phone jack connectors of Line_out and Line_in. The audio chip controller is ALC662 which is compliant with the Azalea standard.			

**MIC (MIC1)** MIC Connector

Part Number

Description MIC Jack Green Vertical 5Pin DIP



Pin	Signal	Pin	Signal
IFC-MBOX2800 offers stereo audio ports by two 3.5 ear phone jack connectors of Line_out and Line_in. The audio chip controller is ALC662 which is compliant with the Azalea standard.			

**Power ON/OFF Button (PWR SW1)**

Part Number

Description Power Button LED PTCT-07-A 5P 7Pin DIP

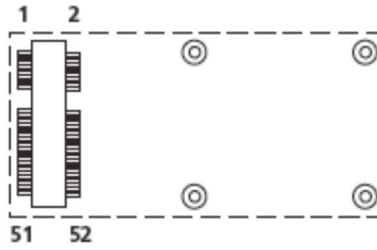


IFC-MBOX2800 comes with a Power On/Off button with LED indicators on the front side to show its On status (Green LED) and Off/Suspend status (Orange LED). Dual functions of Soft Power -On/Off (Instant off or Delay 4 Seconds), and Suspend are supported.

**MINI-PCIE1** Mini-PCle Connector

Part Number

Description Mini-PCle Slot SD-8003-402 52Pin H6.7mm SMD



Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3V_1
3	RSVD1	4	CND7
5	RSVD2	6	+1.5V_1
7	CLKREQ#	8	SIM_PWR
9	CND1	10	SIM_DATA
11	REFCLK-	12	SIM_CLK
13	REFCLK+	14	SIM_RST#
15	CND2	16	SIM_VPP
17	RSVD3	18	CND8
19	RSVD4	20	W_DISABLE#
21	CND3	22	PERST#
23	PER_N0	24	+3.3V_AUX
25	PER_P0	26	CND9
27	CND4	28	+1.5V_2
29	CND5	30	SMB_CLK
31	PET_N0	32	SMB_DATA
33	PET_P0	34	CND10
35	CND6	36	USB_D-
37	RSVD5	38	USB_D+
39	RSVD6	40	CND11
41	RSVD7	42	LED_WWAN#
43	RSVD8	44	LED_WLAN#
45	RSVD9	46	LED_WPAN#
47	RSVD10	48	+1.5V_3
49	RSVD11	50	CND12
51	RSVD12	52	+3.3V_2

Support PCI Express x1 bus Mini PCIE and USB device.

## 2.3 Peripheral Installation

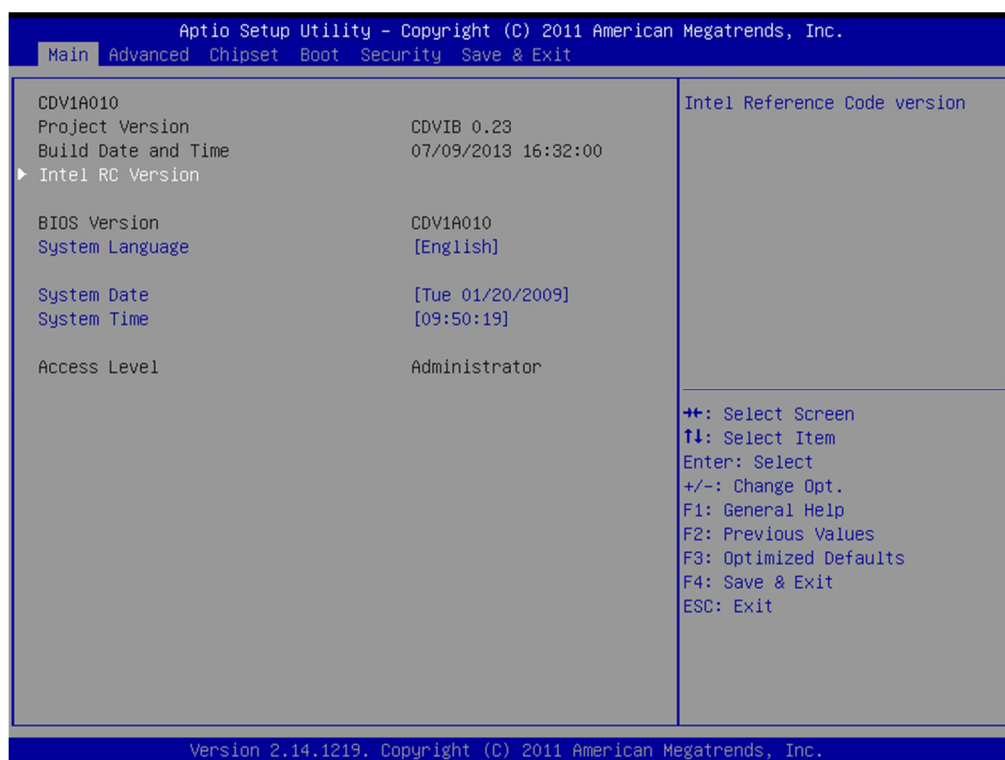
### 2.3.1 HDD Installation (IFC-MBOX2800 only)

# Chapter 3

## BIOS Settings

---

AMIBIOS has been integrated into many motherboards for over a decade. With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the IFC-MBOX2800 BIOS setup screens.



**Figure 3.1 Setup Program Initial Screen**

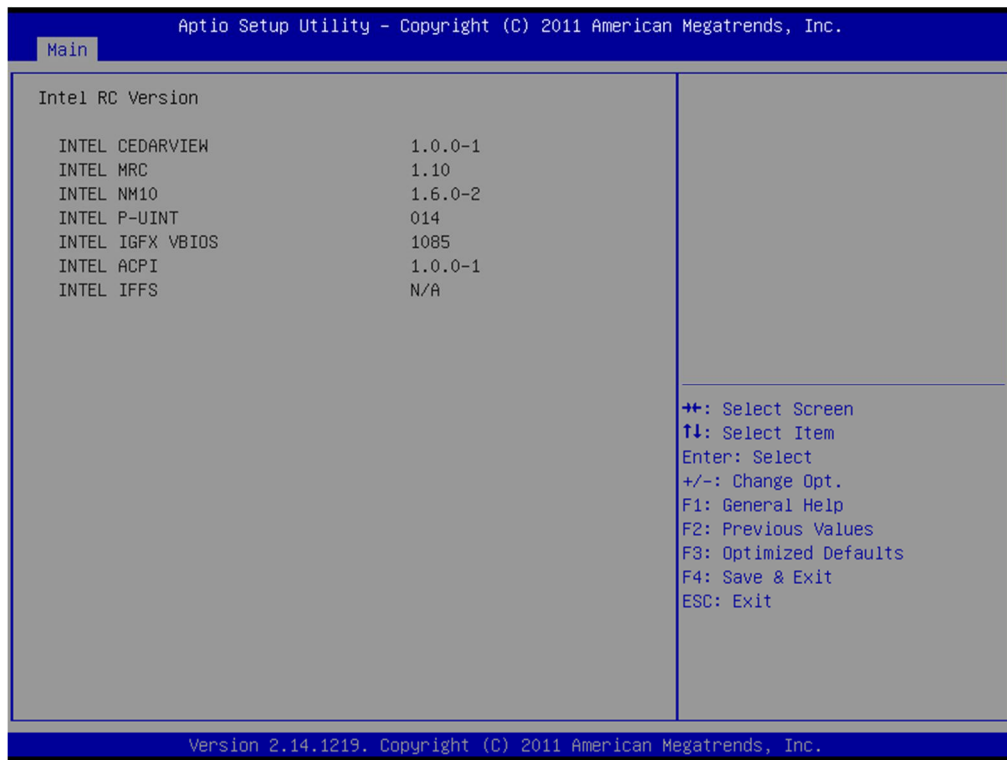
AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in battery-backed CMOS so it retains the Setup information when the power is turned off.

## 3.1 Entering Setup

Turn on the computer and check for the "patch" code. If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact an IFC application engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press <DEL> and you will immediately be allowed to enter Setup.

## 3.2 Main Setup

When you first enter the BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



**Figure 3.2 Main Setup Screen**

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

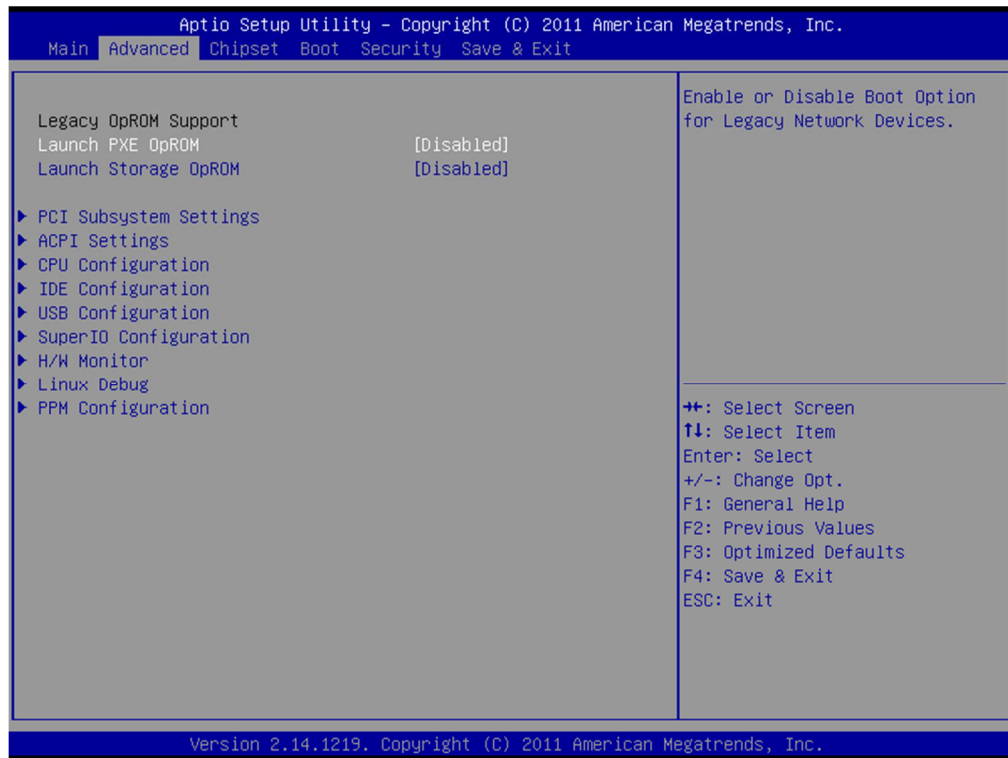
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

### 3.2.1 System Time / System Date

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

### 3.3 Advanced BIOS Features Setup

Select the Advanced tab from the IFC-MBOX2800 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens is shown below. The sub menus are described on the following pages.



**Figure 3.3 Advanced BIOS Features Setup Screen**



### 3.3.1 PCI Subsystem Setting

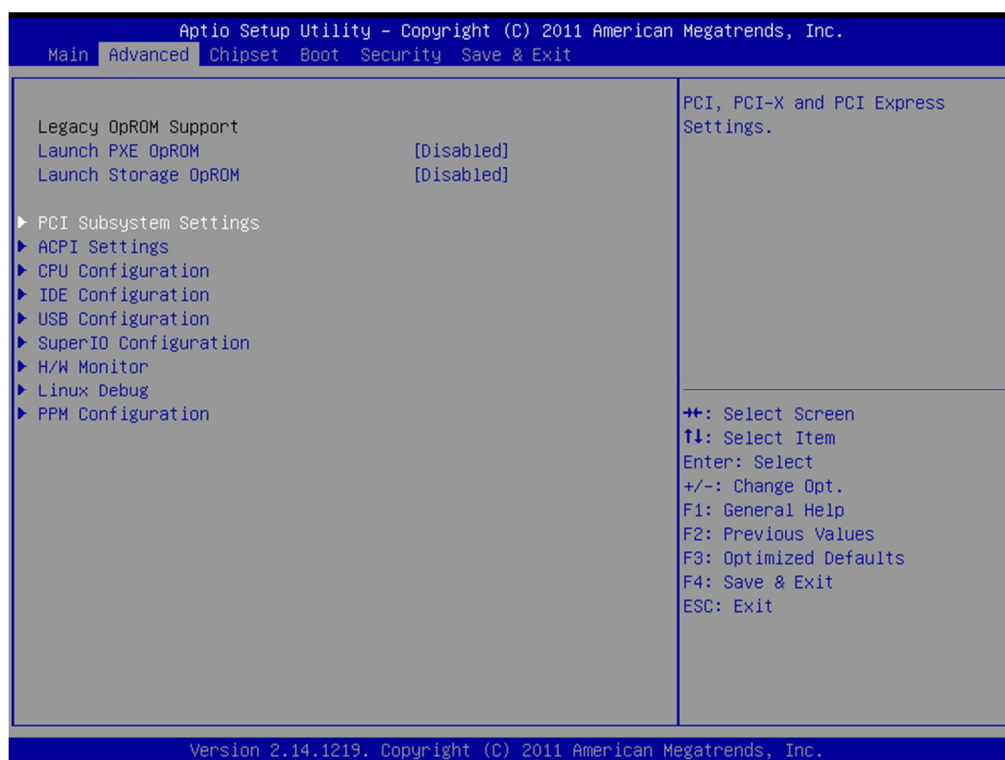
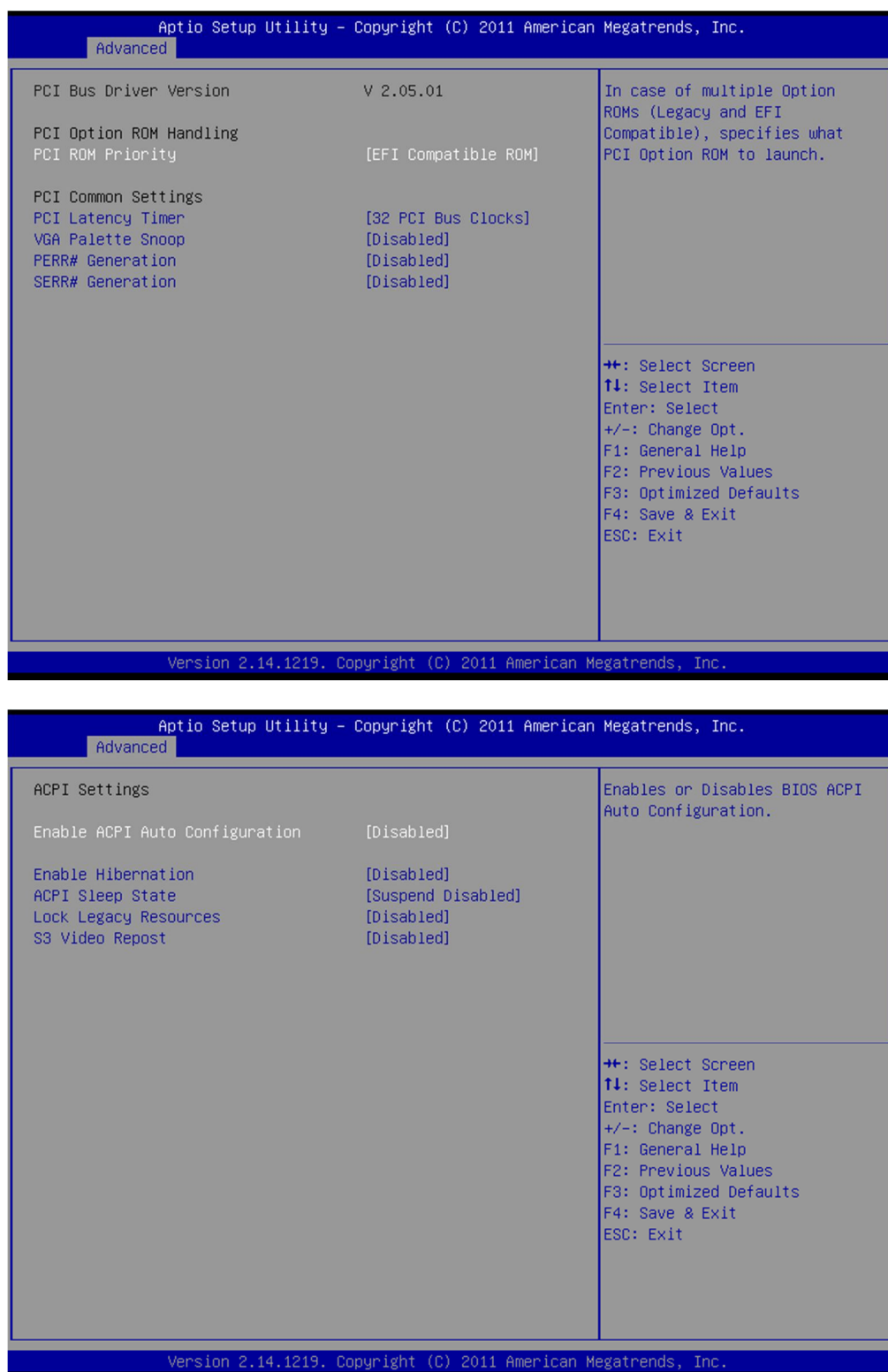


Figure 3.4 PCI Subsystem Configuration Setting

### 3.3.2 ACPI Setting



**Figure 3.5 ACPI Configuration Setting**

### 3.3.3 CPU Configuration Setting



**Figure 3.6 CPU Configuration Setting**

- **Max CPUID Value Limit**

This item allows you to limit CPUID maximum value.

- **Execute-Disable Bit Capability**

This item allows you to enable or disable the No-Execution page protection technology.

### ■ **Hyper Threading Technology**

This item allows you to enable or disable Intel Hyper Threading technology.

## 3.3.4 SATA Configuration



**Figure 3.7 SATA Configuration**

## ■ SATA E Configuration

This item allows you to select Disabled / IDE / AHCI

### 3.3.5 USB Configuration

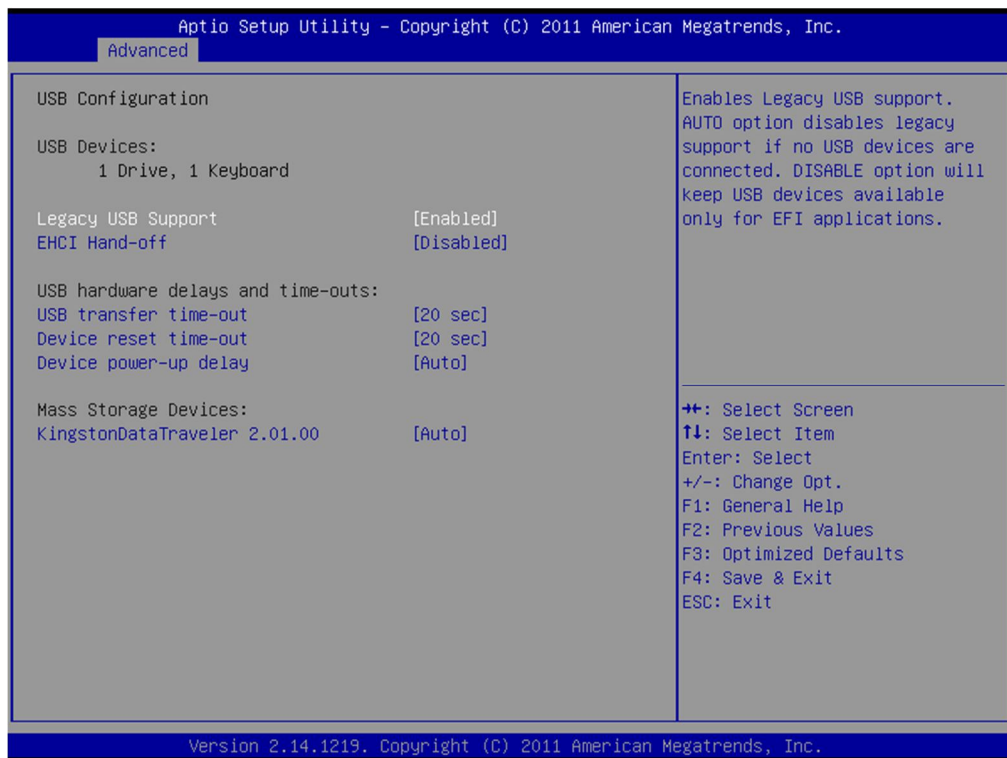
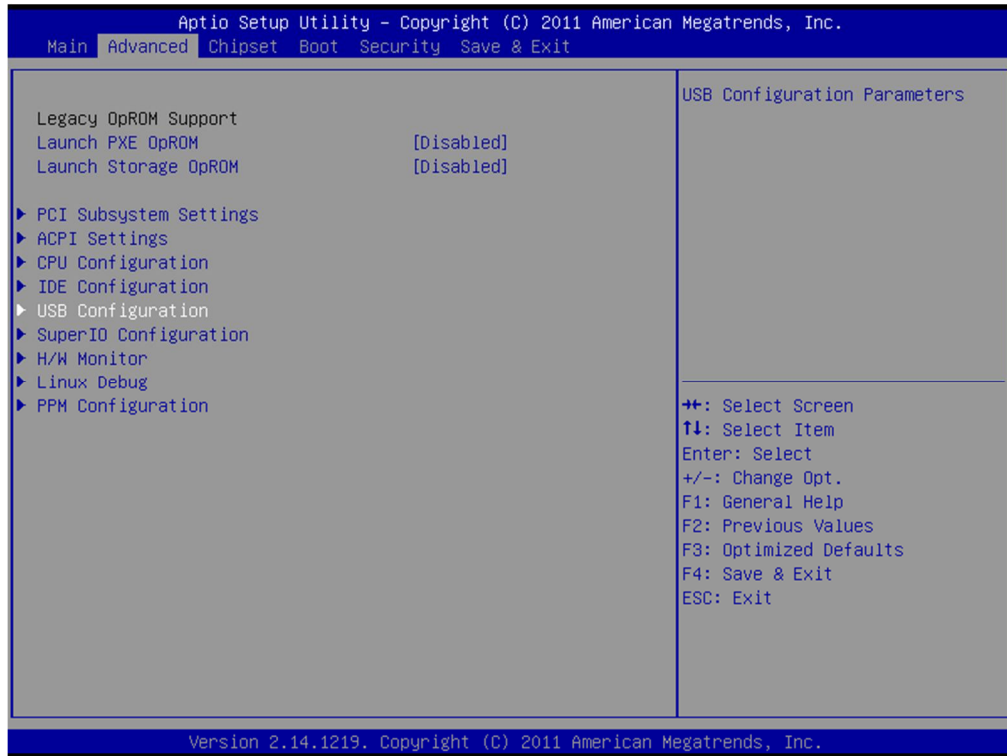
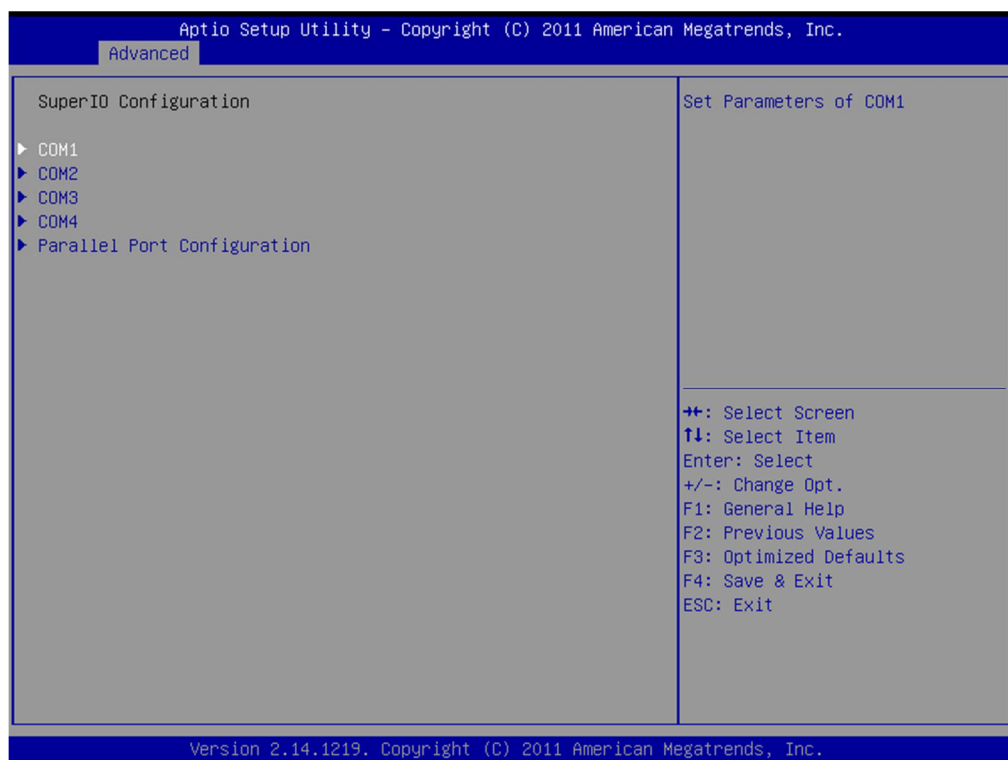
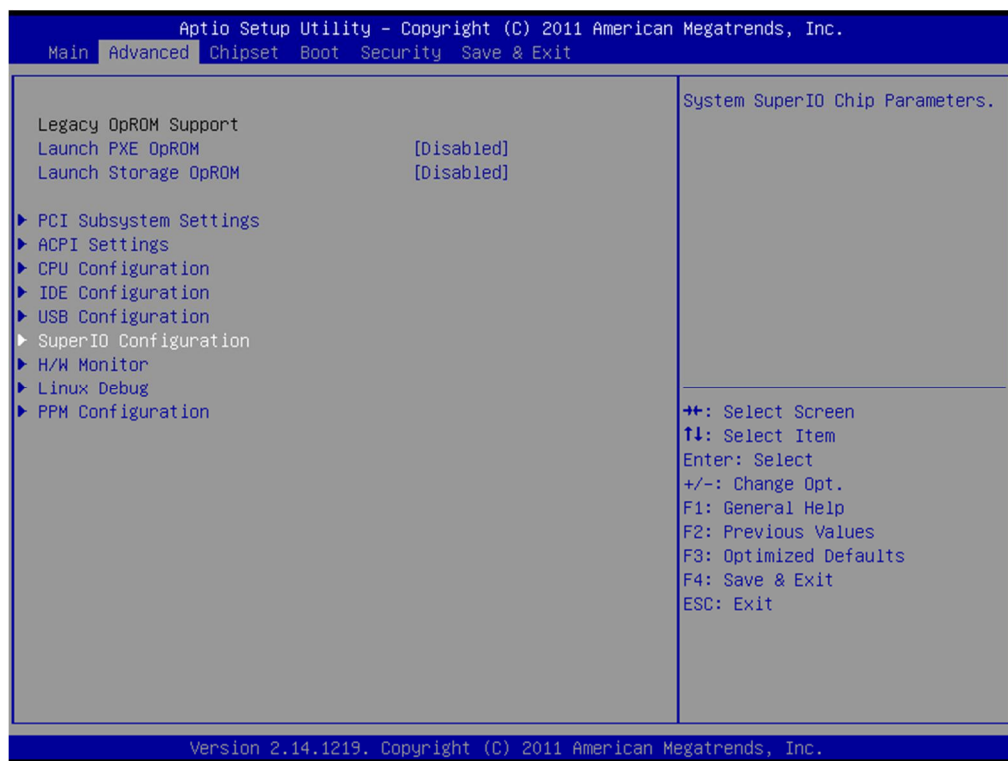
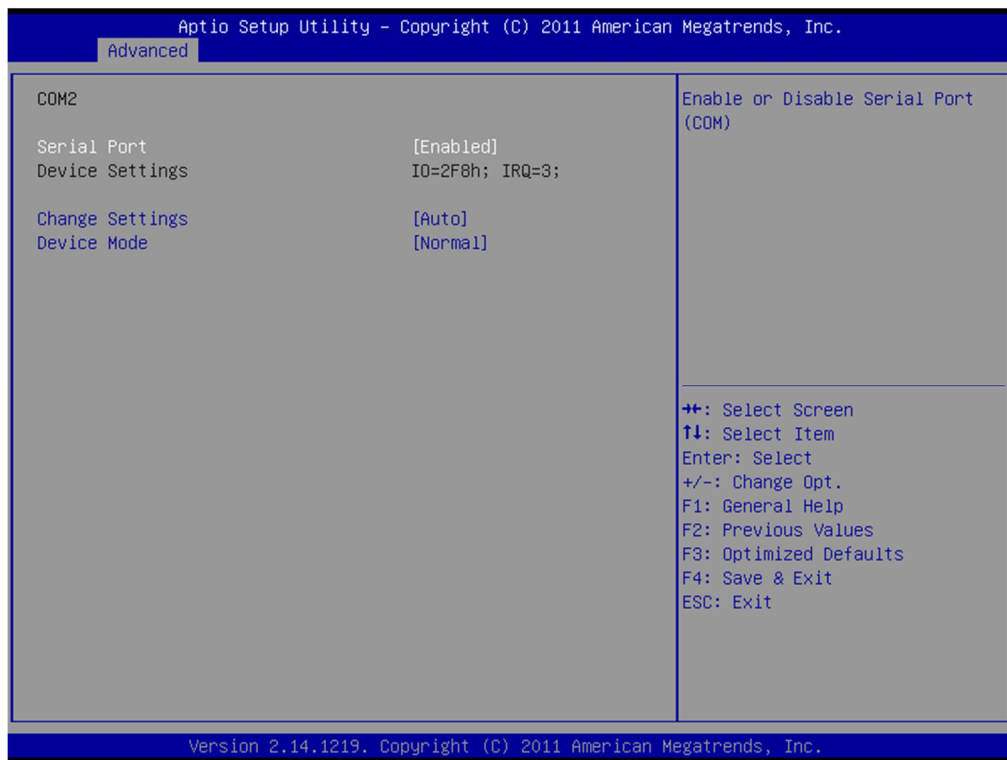
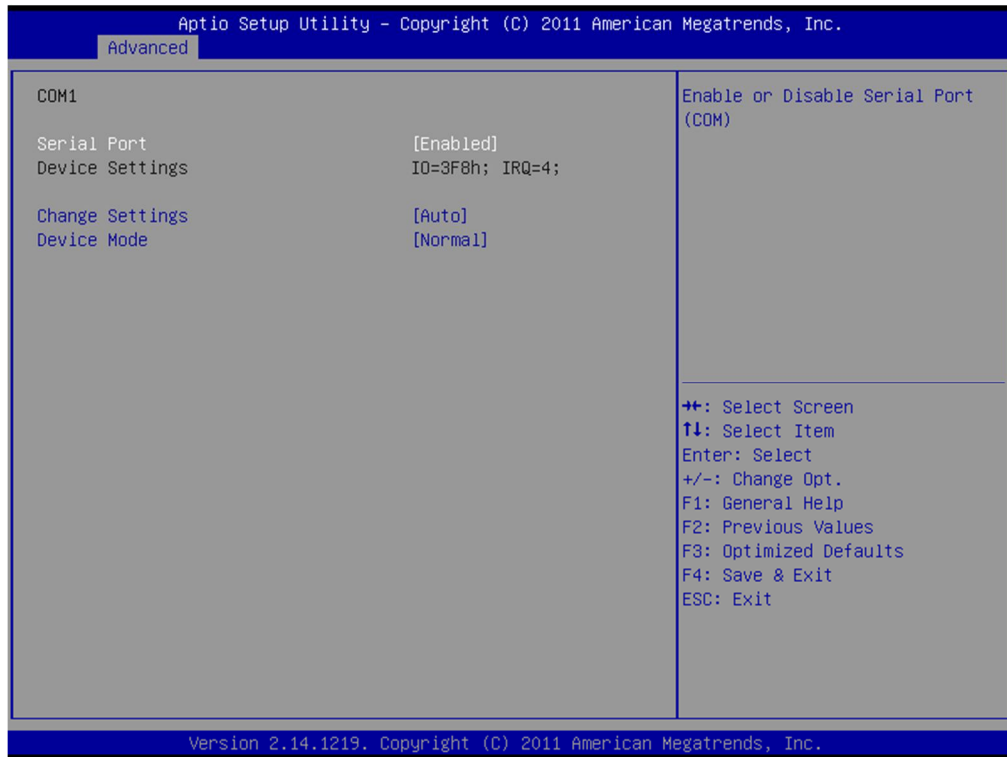


Figure 3.8 USB Configuration

### 3.3.6 Super I/O Configuration





**Figure 3.9 Super I/O Configuration**

■ **Serial Port1- Port2 address**

This item allows you to select serial port1 ~ port2 of base addresses.

■ **Serial Port1- Port2 IRQ**

This item allows you to select serial port1 ~ port2 of IRQ.

### ■ GPIO Setting

These 6bit GPIO are extracted from SIO, but the M/B IFC-MBOX2800 does NOT lead out this function, so this configuration is invalid.

## 3.3.7 PC Health Status

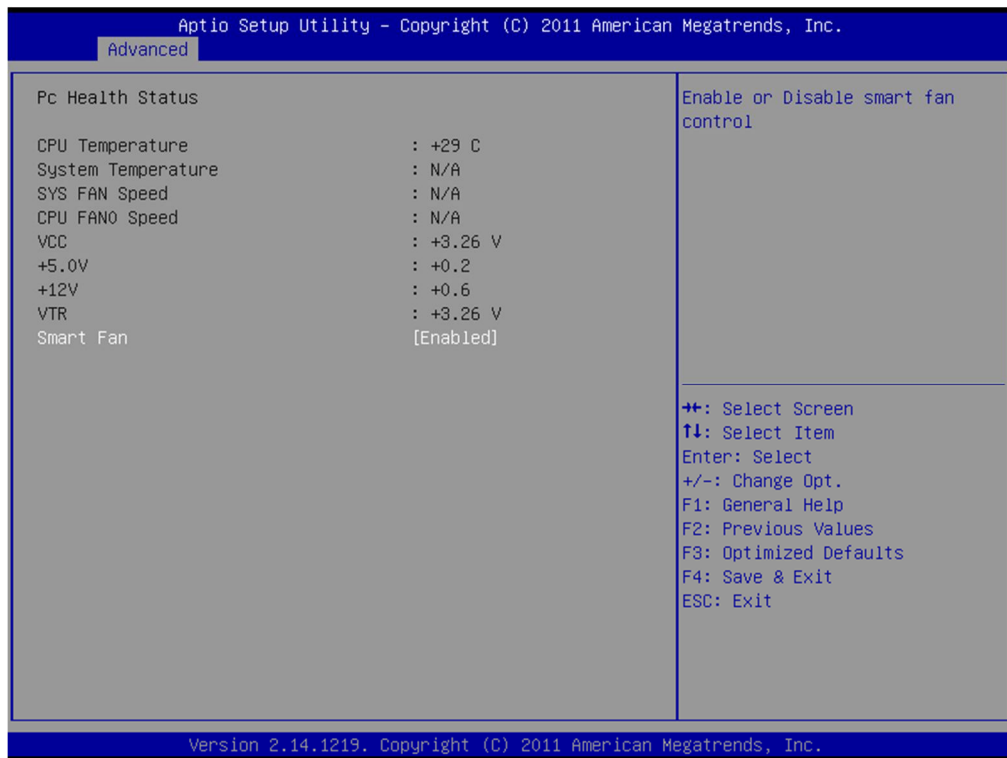
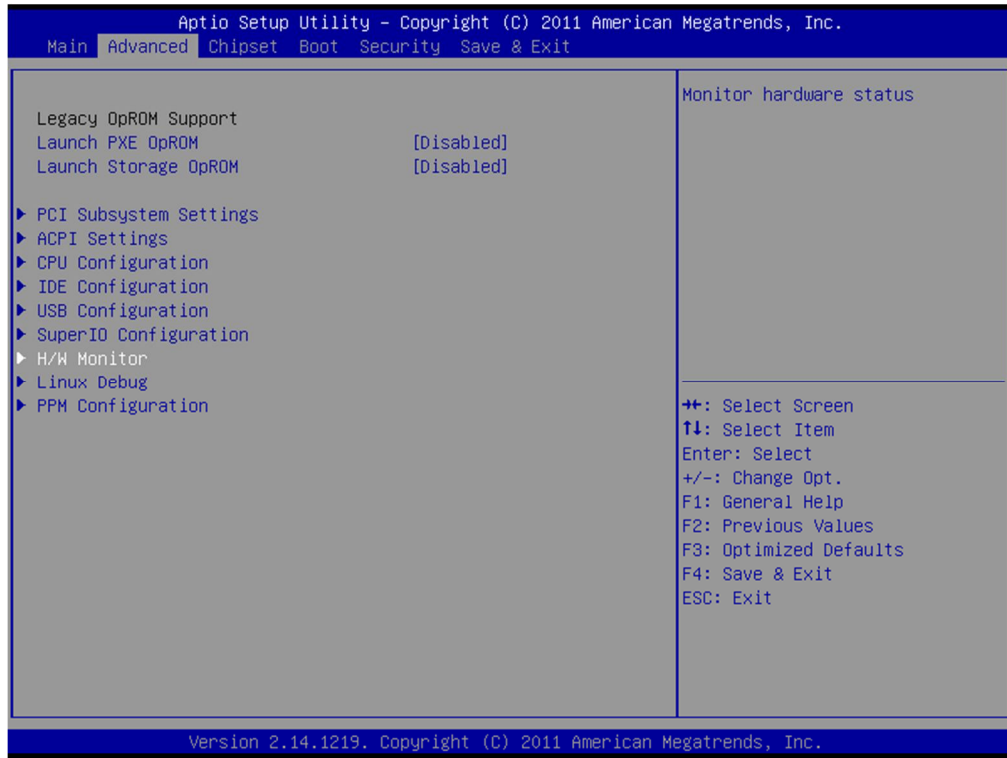


Figure 4.0 PC Health status





### 3.3.8 PPM Configuration

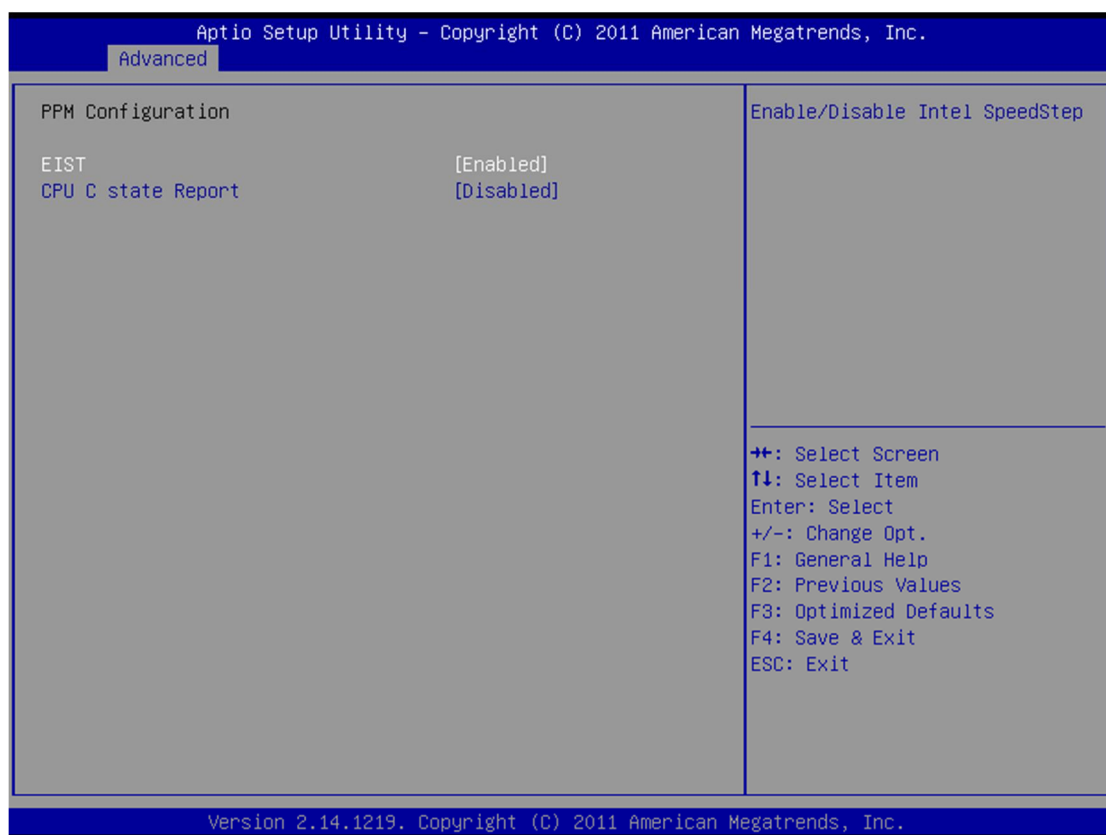
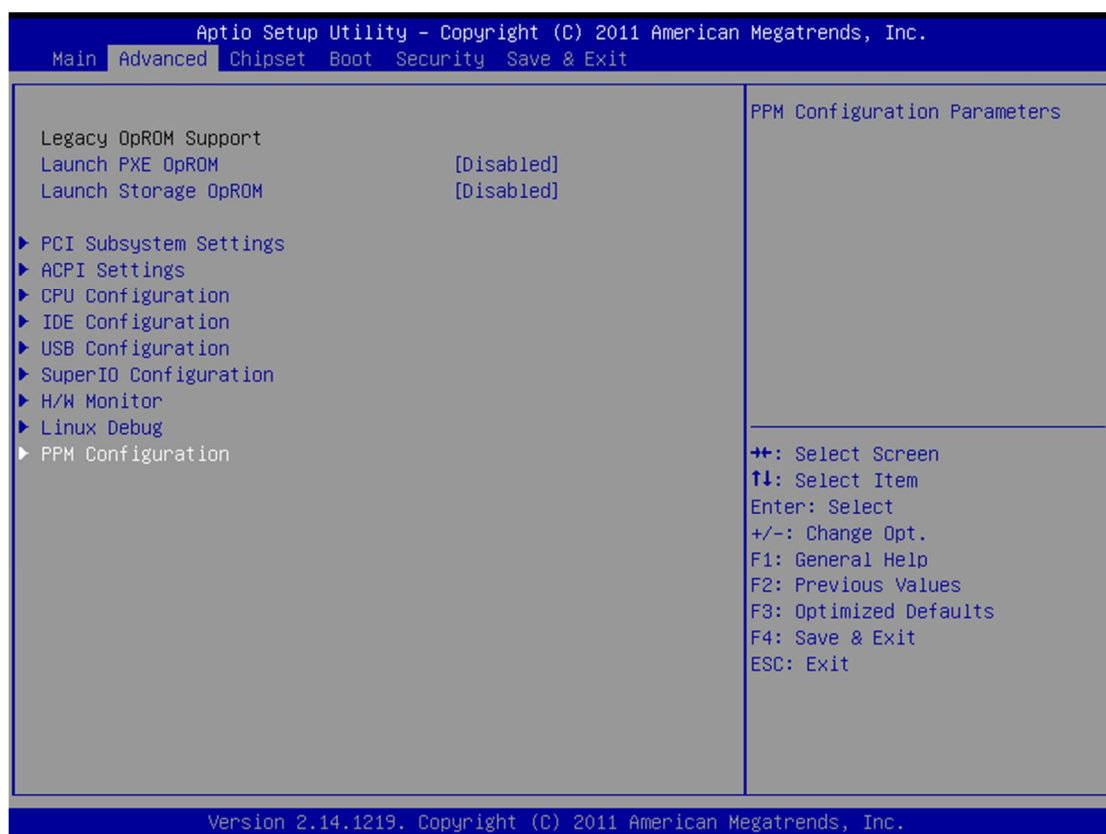


Figure 4.1 PPM Configuration

#### ■ EIST

When configuration is “Enabled”, the M/B will auto-adjust operation frequency according to current CPU operation status, for power saving consideration.

- This selection item also support the configuration of CPU sleep state, support max. Intel C6 mode.

## 3.4 Chipset Settings/HOST Bridge

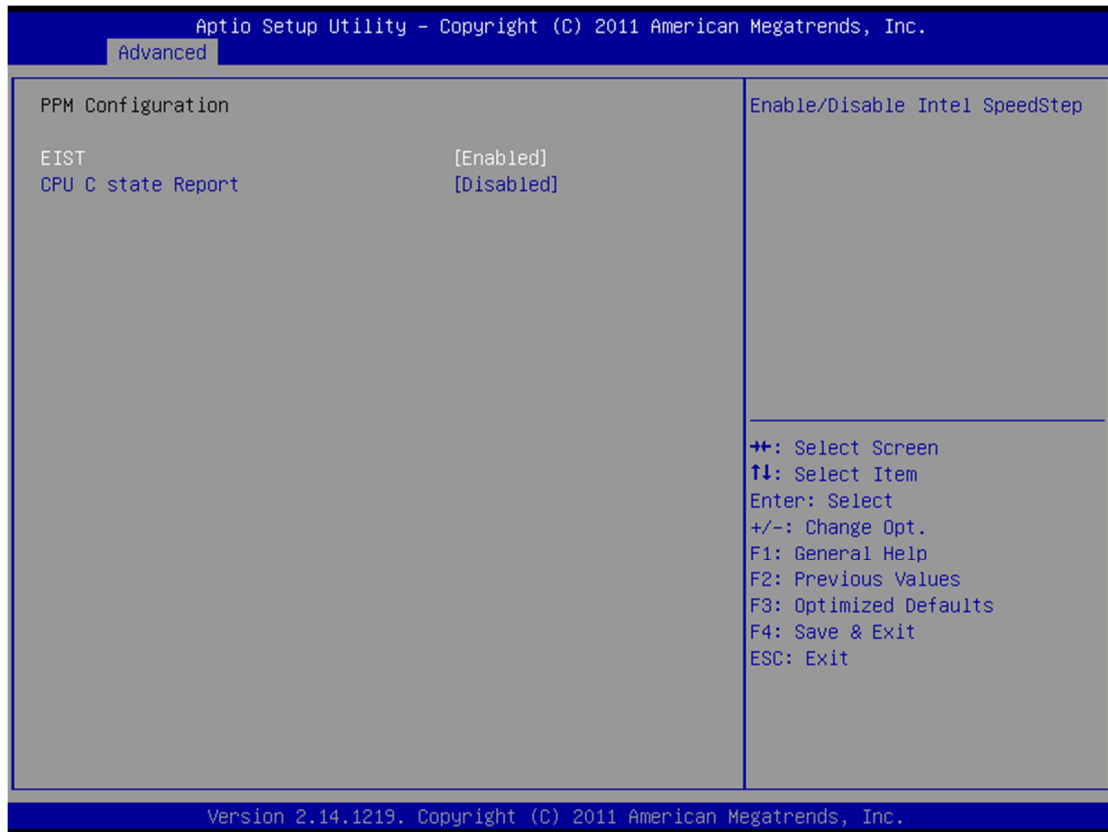


Figure 4.2 Advanced Chipset Settings

### 3.4.1 Intel IGD Configuration

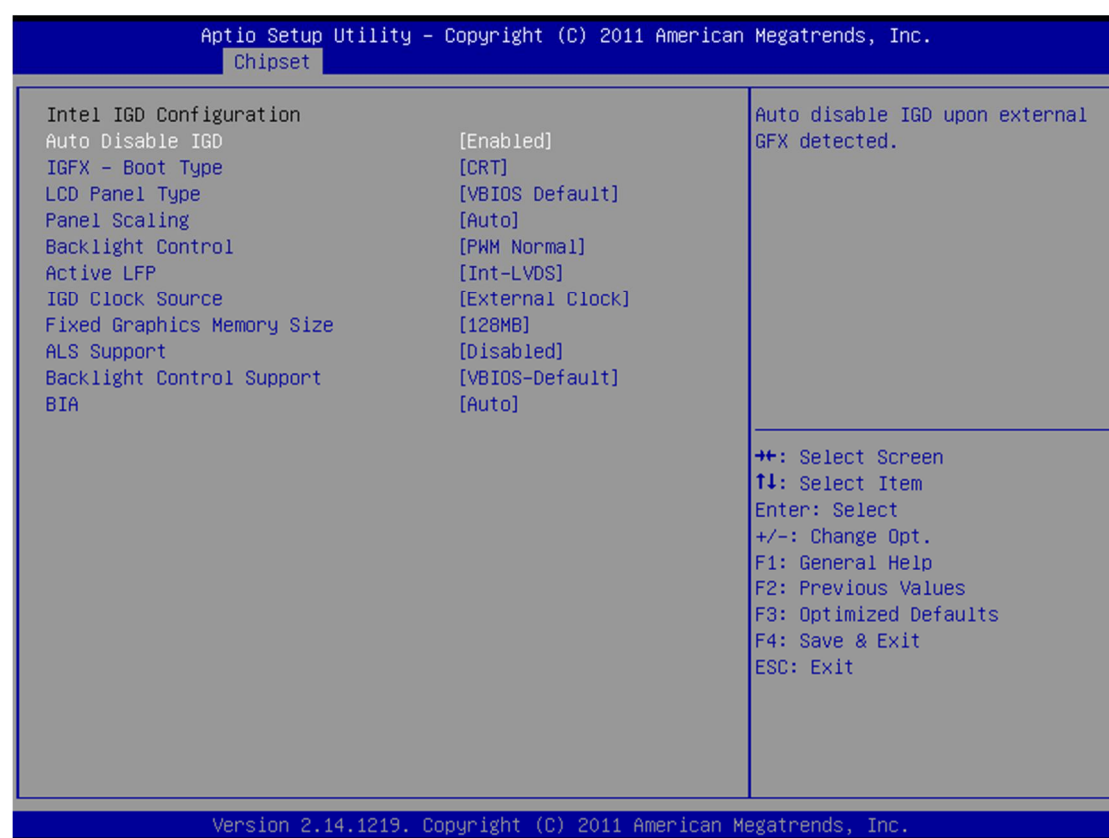
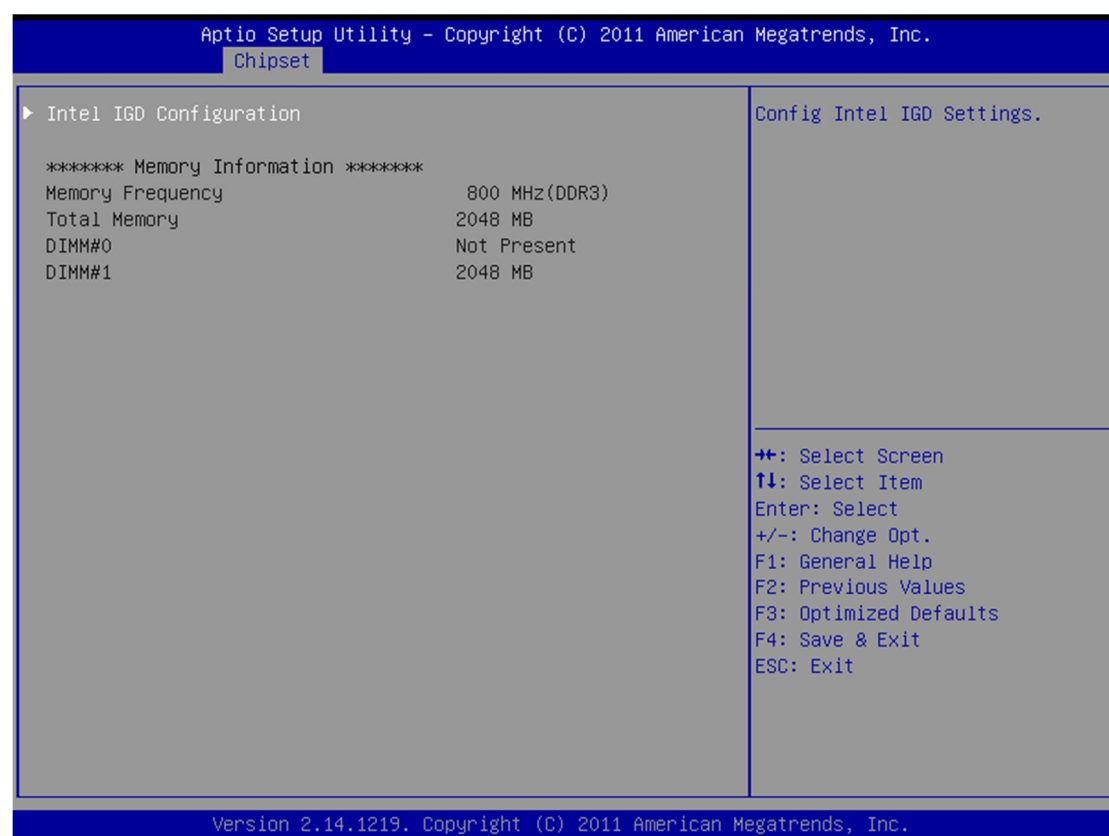
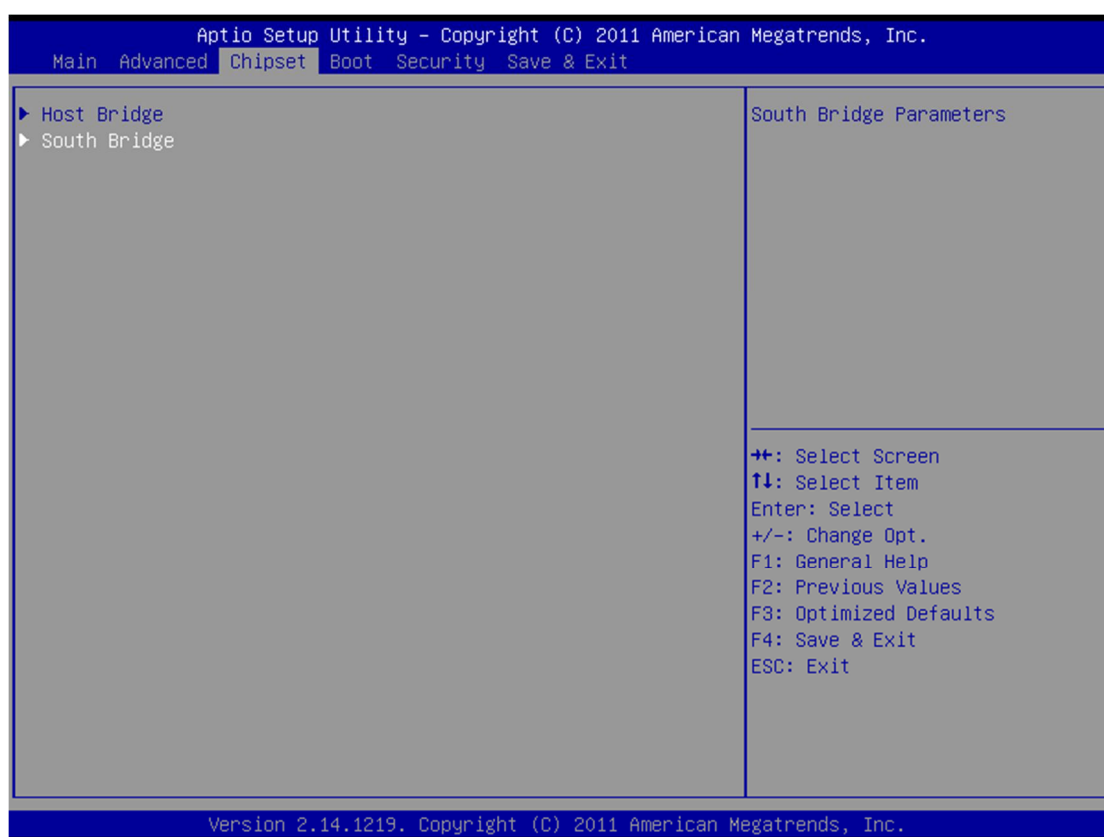


Figure 4.3 PPM Configuration

- This selection item mainly for display application configuration.
- IGFX--Boot Type is for configuration of boot-up main display: VGA/LVDS/VBIOS Default.
- During POST process and DOS mode, only one display device can be chosen for display, otherwise, it won't work; And only after entering to Windows or Linux OS, it can support dual display (simultaneously or asynchronous display).

## 3.5 Chipset Settings/SOUTH Bridge



**Figure 4.4 Advanced Chipset Settings**

## 3.5.1 NM10 Chip Configuration

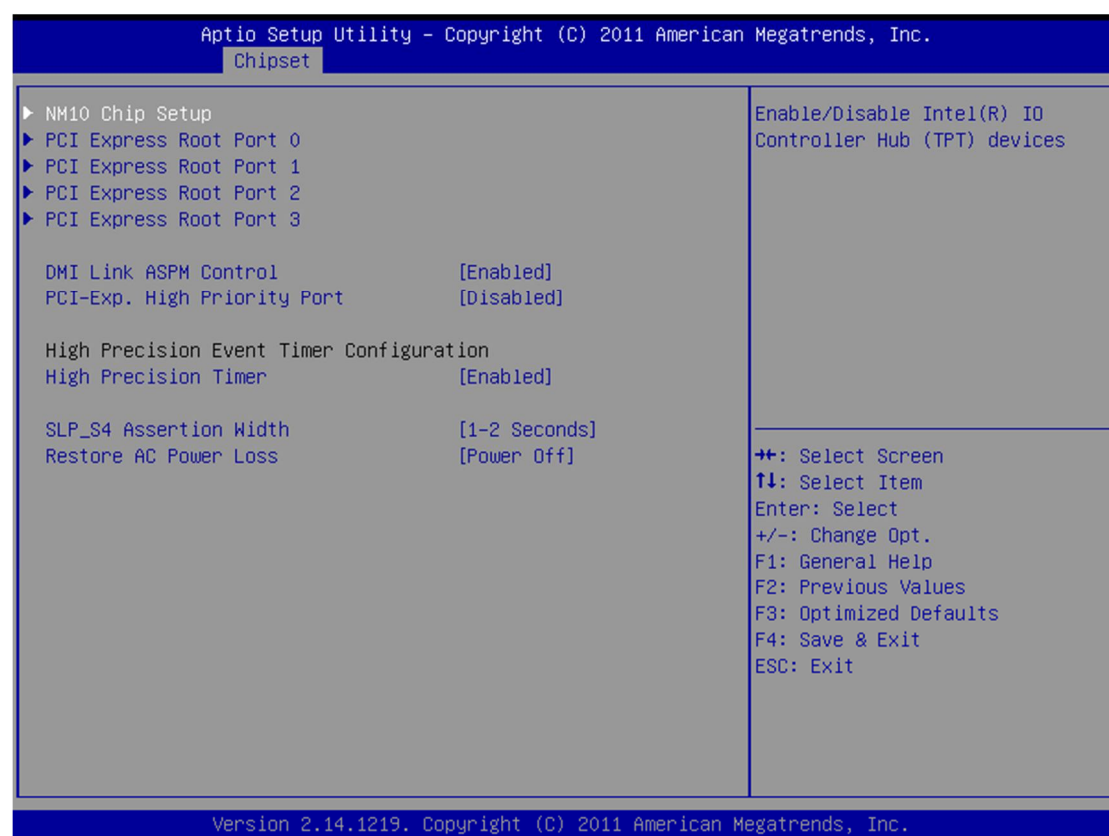
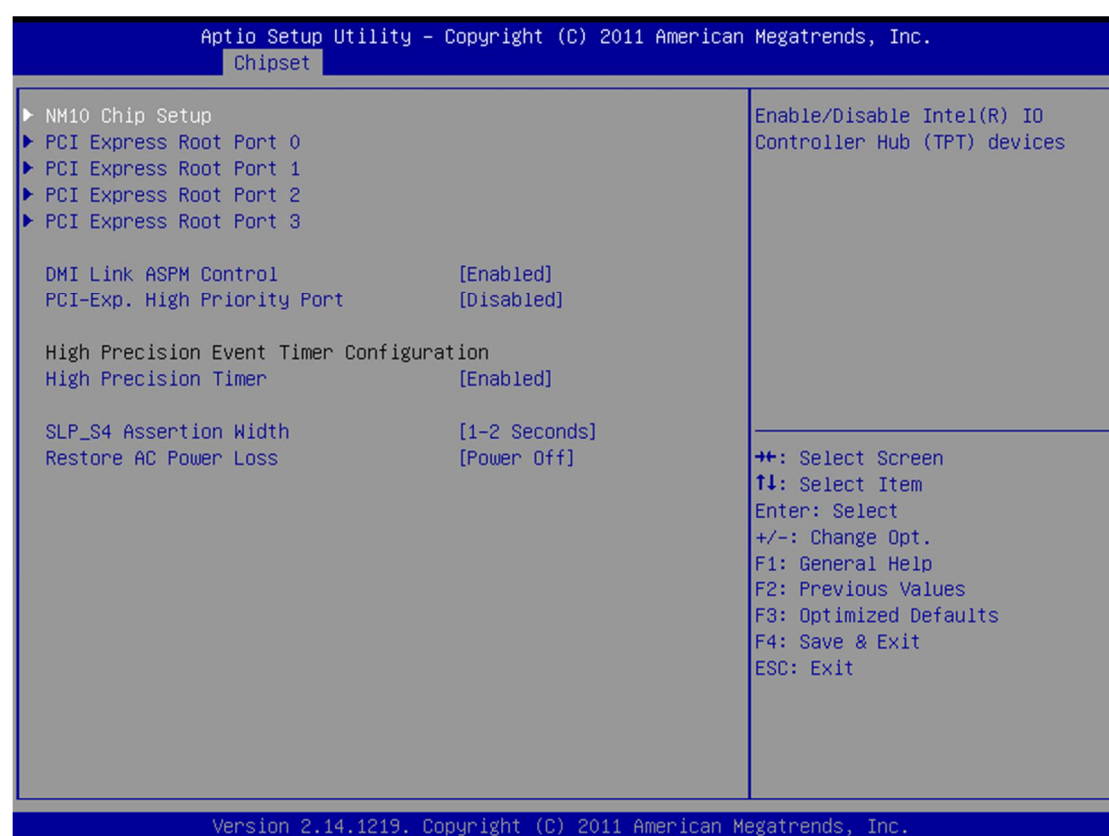
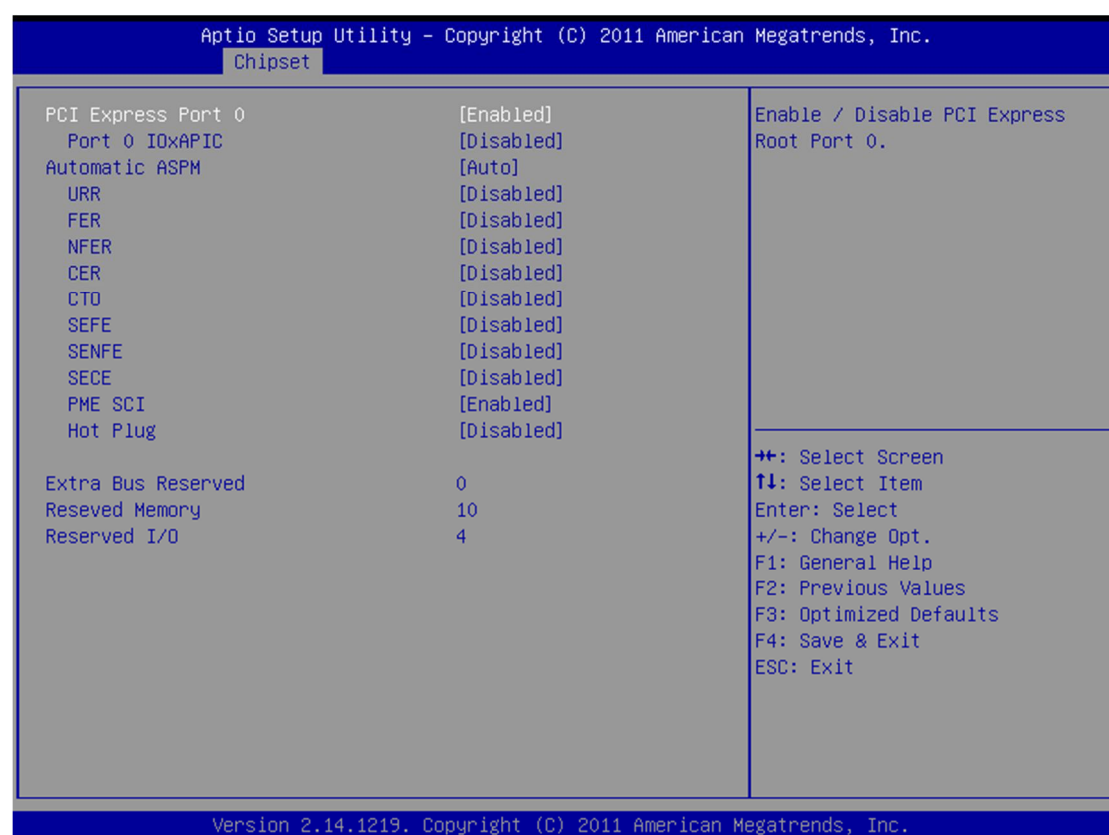
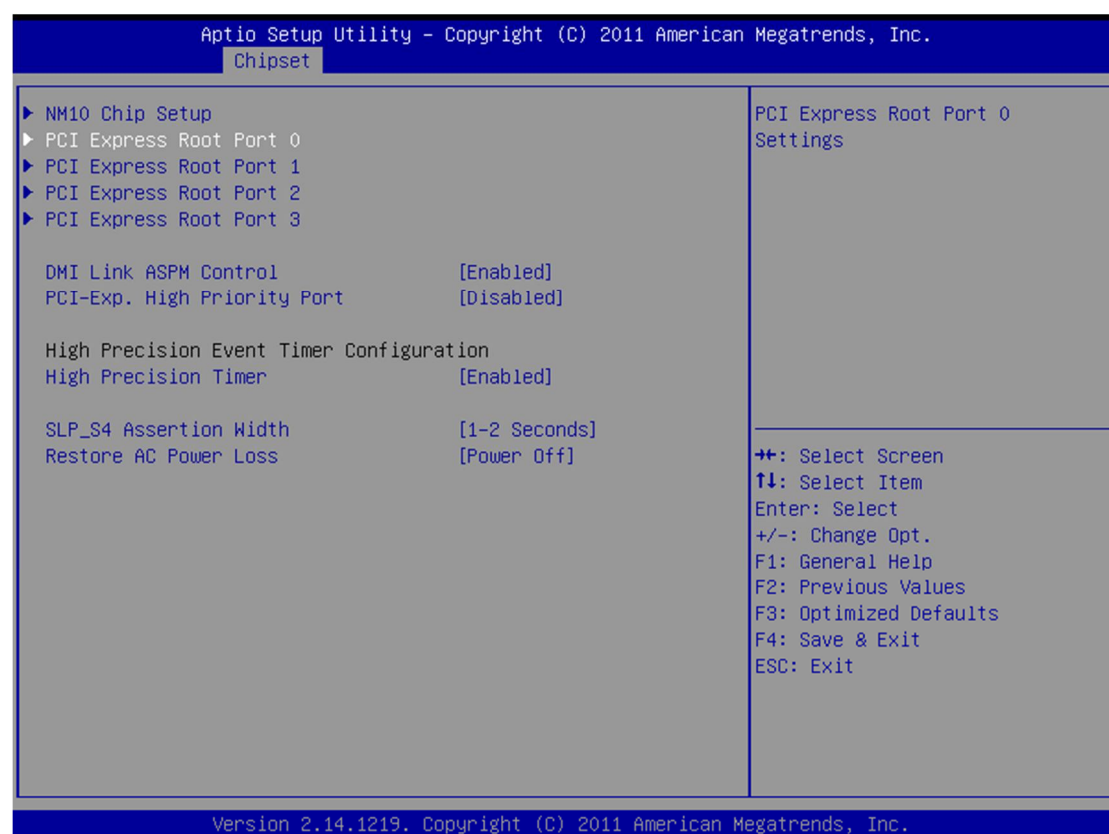


Figure 4.5 NM10 Chip Settings

- **This selection item is for Audio/NM10 Chip integrated network card /SMBus configuration.**
- **LAN controller**  
*IFC-MBOX2800 does Not apply Intel NM10 chipset built-in Intel 82567V LAN controller, so the default setting is “Disabled”.*
- **SMBUS Controller**  
Enables or disables the SMBUS controller.

## 3.5.2 PCI Express Port 0-Port 4 Configuration





Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Chipset		
<ul style="list-style-type: none"> <li>▶ NM10 Chip Setup</li> <li>▶ PCI Express Root Port 0</li> <li>▶ PCI Express Root Port 1</li> <li>▶ PCI Express Root Port 2</li> <li>▶ PCI Express Root Port 3</li> </ul>	PCI Express Root Port 1 Settings	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
DMI Link ASPM Control [Enabled] PCI-Exp. High Priority Port [Disabled]  High Precision Event Timer Configuration High Precision Timer [Enabled]  SLP_S4 Assertion Width [1-2 Seconds] Restore AC Power Loss [Power Off]		
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.		

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Chipset		
PCI Express Port 1 [Auto] Port 0 IOxAPIC [Disabled] Automatic ASPM [Auto] URR [Disabled] FER [Disabled] NFER [Disabled] CER [Disabled] CTO [Disabled] SEFE [Disabled] SENE [Disabled] SECE [Disabled] PME SCI [Enabled] Hot Plug [Disabled]  Extra Bus Reserved 0 Reseved Memory 10 Reserved I/O 4	Enable / Disable PCI Express Root Port 1.	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.		



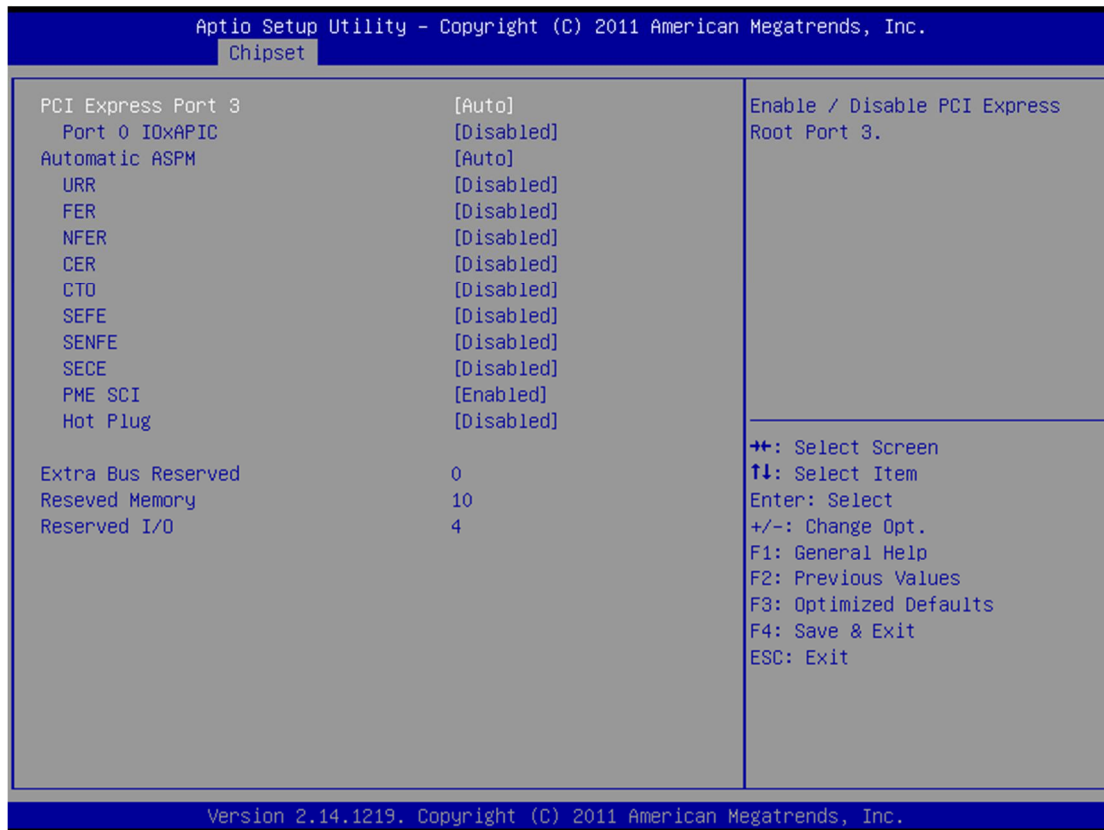
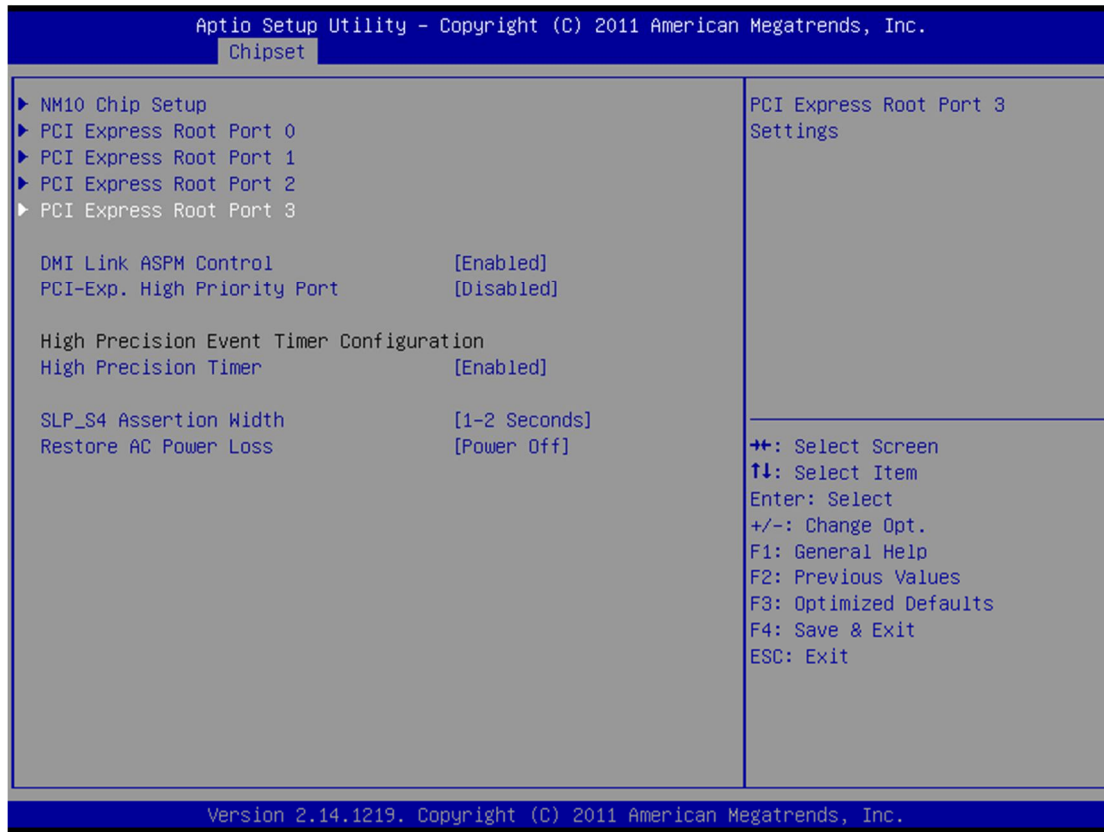
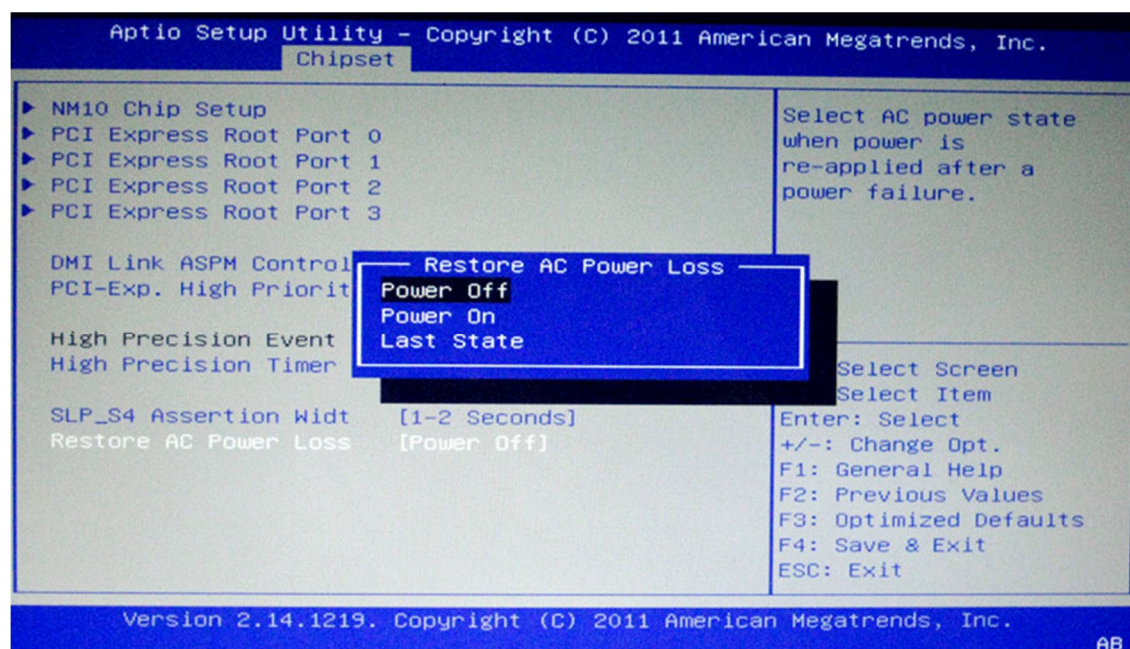


Figure 4.6 PCI Express Port Settings

## ■ SB PCIE Ports Configuration

- Intel NM10 chipset support 4 PCI Express x 1 bus, in which PCIE Port 1和PCIE Port 2 are allocated to onboard LAN1 and LAN2

### 3.5.3 Restore AC Power LOSS Configuration



**Figure 4.7 Restore AC Power LOSS Settings**

- **Power OFF:** After accidental power-off, the device won't automatically boot-up when power-on again.
- **Power ON:** After accidental power-off, the device will automatically boot-up when power-on again.
- **Last State:** After accidental power-off, the device will recover to the state of the former state before power-off. i.e.: If the former state is "Power On", then the device will automatically boot-up when power-on again; if the former state is "Power off", then the device will remain power-off when the power- on again.

### 3.5.4 BOOT Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Main Advanced Chipset <b>Boot</b> Security Save & Exit		
Boot Configuration		Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Setup Prompt Timeout	2	
Bootup NumLock State	[On]	
Quiet Boot		
CSM16 Module Version	[Disabled]	
GateA20 Active	[Upon Request]	
Option ROM Messages	[Force BIOS]	
Boot Option Priorities		
Boot Option #1	[UEFI: KingstonData...]	
Boot Option #2	[KingstonDataTravel...]	
Hard Drive BBS Priorities		
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Main Advanced Chipset <b>Boot</b> <b>Security</b> Save & Exit		
Password Description		Set Administrator Password
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.		
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.		
The password length must be in the following range:		
Minimum length	3	
Maximum length	20	
Administrator Password		
User Password		
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

## 3.6 Exit Option

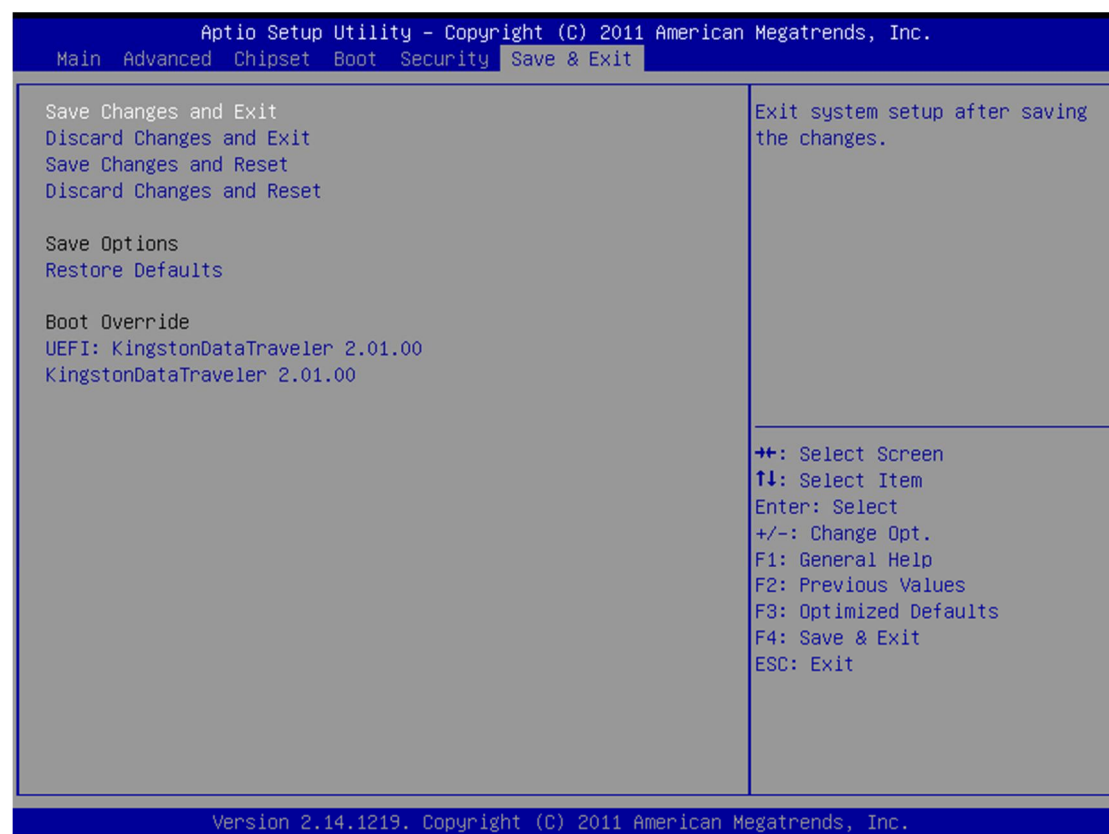


Figure 3.27 Exit Option



### 3.6.1 Save Changes and Exit

When you have completed system configuration, select this option to save your changes, exit BIOS setup and reboot the computer so the new system configuration parameters can take effect.

1. Select Exit Saving Changes from the Exit menu and press <Enter>. The following message appears: Save Configuration Changes and Exit Now? [Ok] [Cancel]
2. Select Ok or cancel.

### 3.6.2 Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

1. Select Exit Discarding Changes from the Exit menu and press <Enter>. The following message appears: Discard Changes and Exit Setup Now? [Ok] [Cancel]
1. Select Ok to discard changes and exit. Discard Changes
2. Select Discard Changes from the Exit menu and press <Enter>.

### 3.6.3 Load Optimal Defaults

The IFC-MBOX2800 automatically configures all setup items to optimal settings when you select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if your computer is experiencing system configuration problems. Select Load Optimal Defaults from the Exit menu and press <Enter>.

### 3.6.4 Load Fail-Safe Defaults

The IFC-MBOX2800 automatically configures all setup options to fail-safe settings when you select this option. Fail-Safe Defaults are designed for maximum system stability, but not maximum performance. Select Fail-Safe Defaults if your computer is experiencing system configuration problems.

1. Select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The following message appears: Load Fail-Safe Defaults? [OK] [Cancel]
2. Select OK to load Fail-Safe defaults.

# Chapter 4

## S/W Introduction & Installation

---



## 4.1 S/W Introduction

IFC provides all the drivers and services as bellow to ensure fast and smooth accomplishment of clients' project:

- Drivers for Windows®XP Professional, Windows7, Linux
- Windows®XP Embedded tailor service;
- Watchdog program example
- GPIO program example
- BIOS upgrade burning and curing service

## 4.2 Driver Install

There is a driver CD with the IFC-MBOX2800 accessory, and all the driver programs are in it, please install the drivers and application programs after the OS installation to ensure the M/B can fully play the great performance. If you are using the upgraded version, we suggest to remove all the drivers and application programs of the old version before installing the new version. For more detailed information, please consult the H/W supplier.

### 4.2.1 Windows®XP Professional Driver Install

- Step1:** Install Chipset driver, open Intel\_Chipset\_WinXP\_infinst\_autol folder, double click Setup to install
- Step2:** Install Graphics driver, double click EMGD\_CDV\_1\_15\_1\_GC\_3278.exe to install
- Step3:** Install audio driver, open Realtek\_WDM\_R270\_WinX folder, double click Setup to install
- Step4:** Install LAN driver, double click Intel 82583v\_PRO2K3XP\_32.exe to install

**REMARK:**

*The display driver for Windows®XP Professional is tailored by using the software tool of Intel EMGD, and this driver program does NOT support 3D and media acceleration function.*

### 4.2.2 Windows® 7 Driver Install

- Step1:** Install Chipset driver, open Intel\_Chipset\_Win7\_infinst\_autol folder, double click Setup
- Step2:** Install Graphics driver, double click Intel GMA3600\_Win7\_32\_8.14.8.1083\_PV.exe
- Step3:** Install audio driver, double click Vista\_Win7\_Win8\_R270.zip
- Step4:** Install LAN driver, double click Intel 82583v\_PRO2K3XP\_32.exe to install

### 4.2.3 Windows Driver Upgrade

Chip manufacturers association regularly to upgrade its corresponding product drive, the user can access through the following links attention or update drive.

■ **Intel Chipset driver upgrade:**

[http://downloadcenter.intel.com/Detail\\_Desc.aspx?agr=Y&DwnldID=20775&lang=eng&wapkw=nm10](http://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&DwnldID=20775&lang=eng&wapkw=nm10)

■ **Intel Graphics driver upgrade:**

[http://downloadcenter.intel.com/Detail\\_Desc.aspx?agr=Y&DwnldID=21690&lang=eng&OSVersion=Windows%20%20\(32-bit\)\\*&DownloadType=Drivers](http://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&DwnldID=21690&lang=eng&OSVersion=Windows%20%20(32-bit)*&DownloadType=Drivers)

■ **Realtek HD audio driver upgrade:**

<http://www.realtek.com.tw/downloads/downloadsView.aspx?Langid=3&PNid=24&PFid=24&Level=4&Conn=3&DownTypeID=3&GetDown=false>

■ **Intel 82583V LAN driver upgrade:**

<http://downloadcenter.intel.com/SearchResult.aspx?lang=ZHO&ProductFamily=%e4%bb%a5%e5%a4%aa%e7%bd%91%e7%bb%84%e4%bb%b6&ProductLine=%e4%bb%a5%e5%a4%aa%e7%bd%91%e6%8e%a7%e5%88%b6%e5%99%a8&ProductProduct=%e8%8b%b1%e7%89%b9%e5%b0%94%c2%ae+82583V+%e5%8d%83%e5%85%86%e4%bb%a5%e5%a4%aa%e7%bd%91%e6%8e%a7%e5%88%b6%e5%99%a8&ProdId=3147&LineId=976&FamilyId=2280>

## 4.2.4 Linux Driver Install

IFC-MBOX2800 provides 2line onboard Intel82583 Giga LAN, since the kernel of Linux OS has not loaded Intel82583 Driver, so when we run Linux OS, we need set PCIE Port 0 and PCIE Port 1 as Disabled, and enter Linux OS to install Intel82583 Driver, then restart OS and set PCIE Port 0 and PCIE Port 1 as Enabled, only after that the LAN can work normally. ( Refer to part 3.5.2 for PCI Express Configuration ) .

## 4.2.5 Linux Driver Upgrade

Chip manufacturers association regularly to upgrade its corresponding product drive, the user can access through the following links attention or update drive.

■ **Intel Graphics driver upgrade:**

<https://01.org/linuxgraphics/downloads>

■ **Realtek HD audio driver upgrade:**

<http://www.realtek.com.tw/downloads/downloadsView.aspx?Langid=3&PNid=24&PFid=24&Level=4&Conn=3&DownTypeID=3&GetDown=false>

## 4.3 Windows®XP Embedded Service

IFC provides free service of Windows®XP Embedded tailor service.

## 4.4 Watchdog program example

A watchdog timer (abbreviated as WDT) is a hardware device which triggers an action, e.g. rebooting the system, if the system does not reset the timer within a specific period of time. The WDT program example provides developers with functions such as

starting the timer, resetting the timer, and setting the timeout value if the hardware requires customized timeout values.

Please contact our service personnel for program example source code and packaging EXE executable file.

#### 4.4.1 WDT Programming Routines

The WDT related 3 registers are located in “W83627DHG”-→ “Logic Device 8”, generally we only use the former two registers, refer to bellow:

Logical Device 8	
CR_F5 (0xF5) Default 0x00	bit [7:5]: Reserved bit, keep it as default value. <b>bit [4]: 1 : ENABLE 0 : DISABLE</b>
	bit3: WDT count-down mode selection —— 0: To count-down in seconds; 1: To count-down in minutes;
	bit [2:0]: Reserved bit, keep it as default value.
CR_F6 (0xF6) Default 0x00	Bit [7:0] —— 0x00: Stop countdown; 0x01: time-out value 1min./sec.; 0x02: time-out value 2min./sec.; 0x03: time-out value 3min./sec.; . . . . . 0xFF: time-out value 255min./sec.;
	This register is to set WDT time-out value, write in a nonzero value, WDT will start to count down from this value. If both of the bit7 and bit6 are set as “1”, then the interrupt from mouse or keyboard would result to re-countdown from this nonzero value.  The value in reading register is the present count down value, not the nonzero initializers.
CR_F7 (0xF7) Default 0x00	bit7 —— 1: Mouse interrupt will reset WDT count-down 0: Mouse interrupt does Not affect WDT count-down
	bit6 —— 1: Keyboard interrupt will reset WDT count-down 0: Keyboard interrupt does Not affect WDT count-down
	bit5 —— 1: Enforce WDT issue time-out-value to event (This bit is Write Only and Self-Clearing)
	bit[4:0]: Reserved bit, keep it as default value.

CR[2Dh]	bit0 — 1: GPIO 0: WDTO#
---------	----------------------------

Refer to routine “WDT.C”.

---

Set the WDT time out value as 10sec., the system will automatically reset when the time is out.

```

_ASM      {
; Enter configuration mode by double writing (unlock SuperIO chip)
    MOV     DX, 2eh
    MOV     AL, 87h
    OUT     DX, AL
    OUT     DX, AL
; select wdt, disable GP50
    MOV     DX, 2eh
    MOV     AL, 2Dh
    OUT     DX, AL

    MOV     DX, 2fh
    IN      AL, DX
    AND     AL, 11111110b ; Clear bit0
    OUT     DX, AL

; Access logical device 8
    MOV     DX, 2eh
    MOV     AL, 07h
    OUT     DX, AL ; Point to
    Logical_Device_Number_Register

    MOV     DX, 2fh
    MOV     AL, 08h
    OUT     DX, AL ; Select logical device 8: WDT

; Setup CR_F5
    MOV     DX, 2eh
    MOV     AL, 0f5h
    OUT     DX, AL ; Select CR_F5: WDT mode (0xF5)

```

```

MOV DX, 2fh
IN     AL, DX                ; Read CR_F5
OR     AL, 00010000b        ; SET bit4 to 1, ENABLE
AND    AL, 11110111b        ; Clear bit3, setup to second-base
OUT    DX, AL                ; Update CR_F5

; Write CR_F6
MOV DX, 2eh
MOV AL, 0f6h
OUT    DX, AL                ; Select CR_F6: Time-out value (0xF6)

MOV DX, 2fh
MOV AL, 0ah                  ; Time-out value is 10
OUT    DX, AL                ; Update CR_F6, start counting down

; Exit configuration mode to prevent unexpected operation (lock SuperIO chip)
MOV DX, 2eh
MOV AL, 0aah
OUT    DX, AL
}

```

---

## 4.5 GPIO program example

General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. It allows users to monitor the level of signal input or set the output status to switch on/off a device. Our program example also provides Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.

Please contact our service personnel for program example source code and packaging EXE executable file.

### 4.5.1 Overview

This instruction is only applied to the ENC-5866 Motherboard with NM10 chipset. Altogether there are 8 sets GPIO on this M/B.

The level of input/output of all those 8 sets GPIO (GP0、GP6、GP9、GP10、GP12、GP13、GP14、GP22) are designed as 3.3VTTL.

**Correspondence between GPIO interface and actual GPIO signal:**

Iutput Type								
Interface S/N	1	2	3	4	5	6	7	8
GPIO Signal	GP0	GP6	GP9	GP10	GP12	GP13	GP14	GP22

We don't recommend using those GPIO to directly drive devices which require comparatively large current (eg. Relay, Optocoupler etc.. )

Besides, it also provides a 255sec./min. countdown WDT (Watch Dog Timer).

#### 4.5.2 GPIO programming model

- A. Configure GPIO Output: Running application "GPIOOUT.EXE" to set these 8 GPIO as output. Please refer to "GPIOOUT.CPP" for reference code.
- B. Configure GPIO as "High": Running application "HIGHGPIO.EXE" to set these 8 GPIO output as "High". Please refer to "HIGHGPIO.CPP" for reference code.
- C. Configure GPIO as "Low": Running application "LOWGPIO.EXE" to set these 8 GPIO output as "Low". Please refer to "LOWGPIO.CPP" for reference code.

**Remark:**

***During the configuration process of setting "Output High/Low", we can use multimeter or indicator to testify, or we can also check the status by running GETIO.***

- Configure GPIO Input: Running application "GPIOIN.EXE" to set these 8 GPIO as "Input". Please refer to "GPIOIN.CPP" for reference code.

**Remark:**

***During the configuration process of setting "Input High/Low", we can check the status by running GETIO.***

## 4.6 BIOS Service

The BIOS Flash utility allows customers to update the flash ROM BIOS version, or use it to back up current BIOS by copying it from the flash chip to a file on customers' disk. The BIOS Flash utility also provides a command line version for fast implementation into customized applications.

IFC also provides BIOS curing service for clients.

#### 4.6.1 BIOS Upgrade Tool Instruction

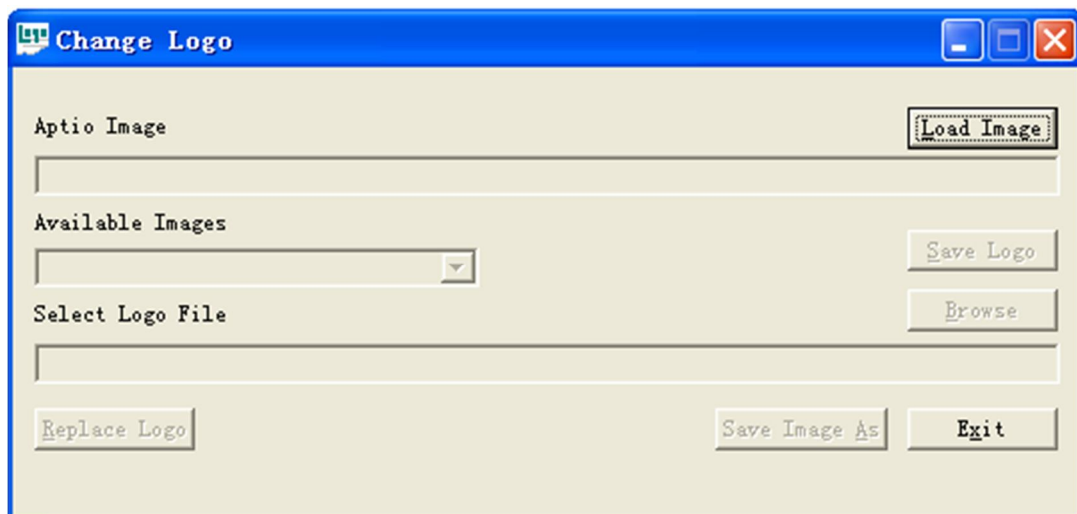
- The burner can be only applied to DOS environment, the user should prepare a boot disk with DOS system before BIOS burning process;
- Copy burner "EFIDOS.EXE" and the BIOS file to the root directory of the DOS boot disk;

- Connect the DOS boot disk to the M/B, startup and press “DEL” to enter CMOS setting interface, and set the DOS boot disk as the first boot device in “boot”→BIOS;
- Press F10 to save the new setting and reset the system;
- When the M/B enter DOS system, and display the drive letter of DOS system, please input the command character as bellow, and then press “Enter” (Assume the BIOS file named “BIOS.ROM”):
- EFIDOS /IBIOS.ROM /pbnc /n
- After “Enter”, BIOS start to refresh, the M/B is not allowed to be turned-off, reset or power-off etc. during the whole refresh process, otherwise the M/B will not be able to start up again. When the BIOS burning process is finished, the user can reset the system.

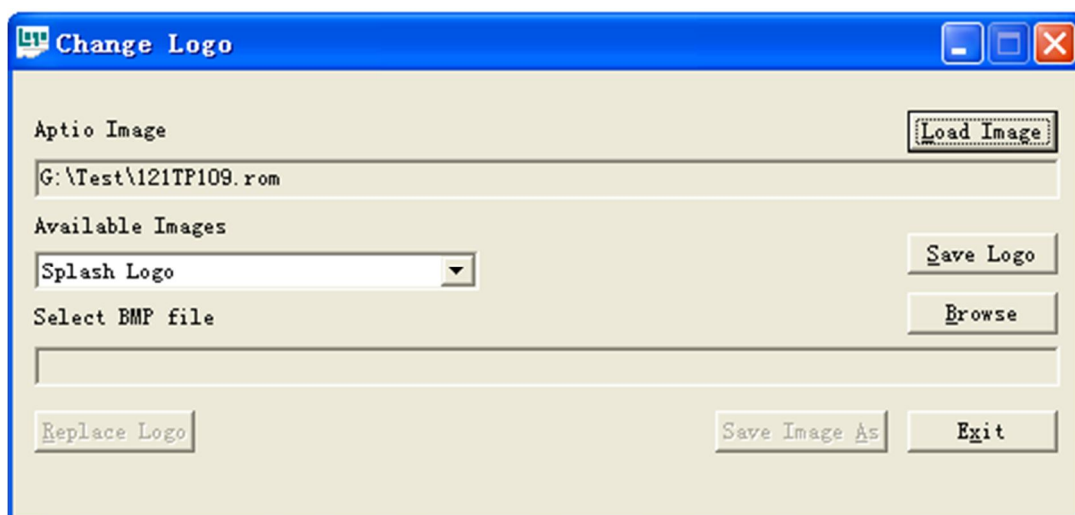
## 4.6.2 BIOS LOGO Replacement Tool Instruction

- Logo change can be directed as following steps
- Save the primary “Splash Logo” of BIOS
- Save the primary “Small Logo” of BIOS
- Replace the primary “Splash Logo” of BIOS
- Replace the primary “Small Logo” of BIOS

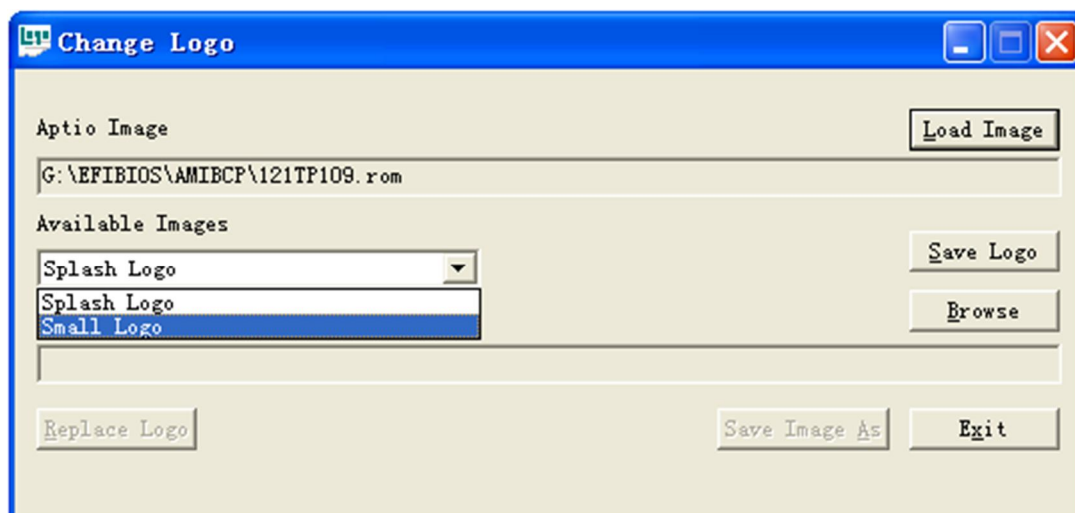
1. User interface of “ChangeLogo.exe” :



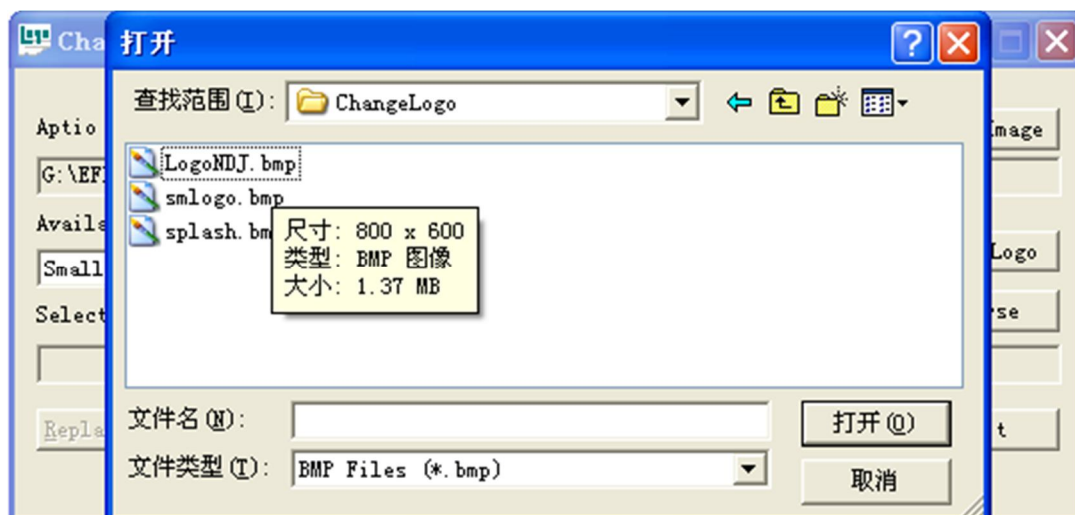
- Click “Load Image” to load the primary BIOS file.



- Select the logo which will be saved from the drop-down box of “Splash Logo”, then click “save logo” to save the logo under a specified directory.

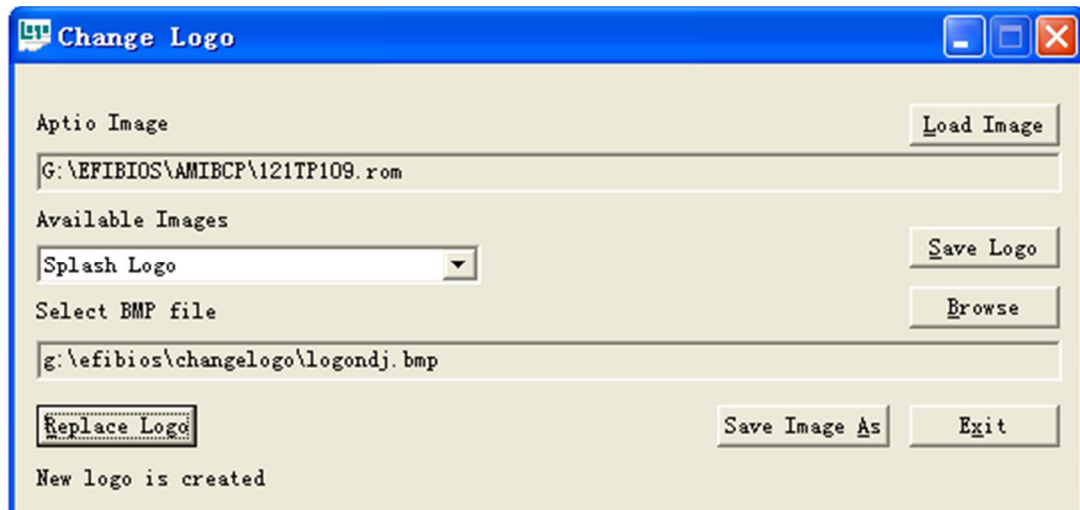


- During the Logo replacement operation, please click “Browse” to select Logo which is to be adopted in the BIOS, and the image size must be 800x600 or 640x480 with BMP format:





5. After selecting the right Logo, click “Replace Logo”, then the Logo replacement is done:



6. After clicking “Replace Logo”, there will be a message shows up:“ New logo is created”, which means the new Logo is replaced successfully. If you replace “Splash Logo”, then the new BIOS Logo will be displayed with full screen after the system reboot; if you replace “Small Logo”, then the new BIOS Logo will be displayed on the up-left corner of the screen after the system reboot.
7. Click “Save Image AS”, to save the new BIOS under a specified directory.
8. If it doesn't display the new BIOS Logo after system reboot, please check if the setting as bellow is Enable:  
Boot-->Quiet Boot-->Enable

# Chapter 5

## Appendix: A

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## A.1 System I/O Ports

Addr.	Range
000-01F	DMA
020-021	Interrupt
040-043	Timer/Counter
060-06F	8042
070-07F	Real-time
080-09F	DMA
0A0-0BF	Interrupt
0C0-0DF	DMA
274-279	ISAPNP read data port
2F8-2FF	COM2
3B0-3DF	VgaSave
3F8-3FF	COM1
400-4D1	Interrupt
500-77F	Motherboard
A79-A79	ISAPNP read data port
B78-B7F	Motherboard

**Table 5.1: System I/O Ports**

## A.2 1st MB Memory Map

Addr. Range (Hex)	Device
00000000h - 00003FFFh	Motherboard resources
000A0000h - FEBFFFFFFh	PCI bus
FEC00000h - FEC00FFFh	Motherboard resources
FED00000h - FED003FFFh	High precision event timer
FED14000h - FED19FFFh	System board
FED1C000h - FEE00FFFh	Motherboard resources
FF000000h - FFFFFFFFh	Intel 82802 firmware Hub Device

**Table 5.2: 1st MB Memory Map**

## A.3 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Available
3	Available
4	Direct memory access controller
5	Available
6	Available
7	Available

**Table 5.3: DMA Channel Assignments**

## A.4 Interrupt Assignments

Interrupt#	Interrupt source
IRQ0	System timer
IRQ1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ3	COM2
IRQ4	COM1
IRQ8	System CMOS/real time clock
IRQ9	Microsoft ACPI-Compliant System
IRQ11	SMBUS Controller
IRQ16	Network /USB
IRQ17	Network
IRQ18	USB
IRQ19	SATA
IRQ22	HDA
IRQ23	USB

**Table 5.4: Interrupt Assignments**



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